AVIATION

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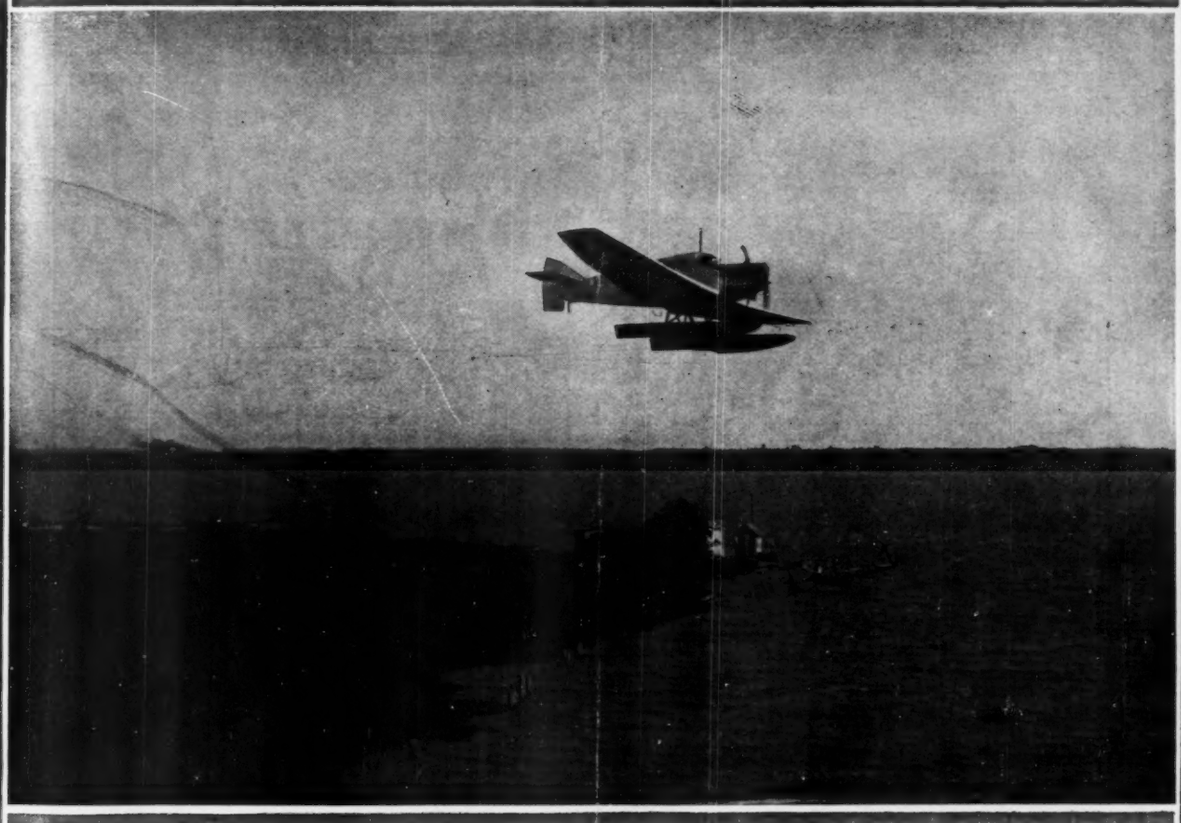

Civil Air Transport in South America: Junkers seaplane over the Magdalena River, Colombia

VOLUME XIV

Number 5

SPECIAL FEATURES

FOREIGN AIR TRANSPORT BY SEAPLANE

IMPROVED EQUIPMENT FOR NIGHT FLYING

ABSTRACT OF THE CIVIL AERONAUTICS ACT

AVIATION ENGINES AT THE PARIS EXPOSITION

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

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JANUARY 29, 1923

AVIATION

VOL. XIV. NO. 5

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CONTENTS

Editorials	121	Liquor Smuggling by Aircraft	134
Foreign Air Transport by Seaplane	122	Secret British Aircraft Development	135
Progress of Commercial Aviation in France	125	De Bothezat Helicopter Lifts Two Persons	135
Aircraft Movements at Le Bourget Airport	125	Trials of the New Oehmichen Helicopter	135
Abstract of the Civil Aeronautics Act	126	Germany and the I.A.C.	135
Air Activities, Underwriters' Laboratories	128	Brazil to Purchase Airplanes	135
Rogers B4 50 hp. Air-Cooled Engine	129	Relative Strength of European Air Forces	136
"Speed" Displaces "Hikko"	129	Italian Air Reorganization	136
Improved Equipment for Night Flying	130	Movies of Aviation Appreciated	136
New Pioneer Turn Indicator	131	A Junkers-Dornier Project	136
Aeronautical Engines at the Paris Exposition	132	Army and Navy Air News	137
Survey of the Aircraft Industry	134		

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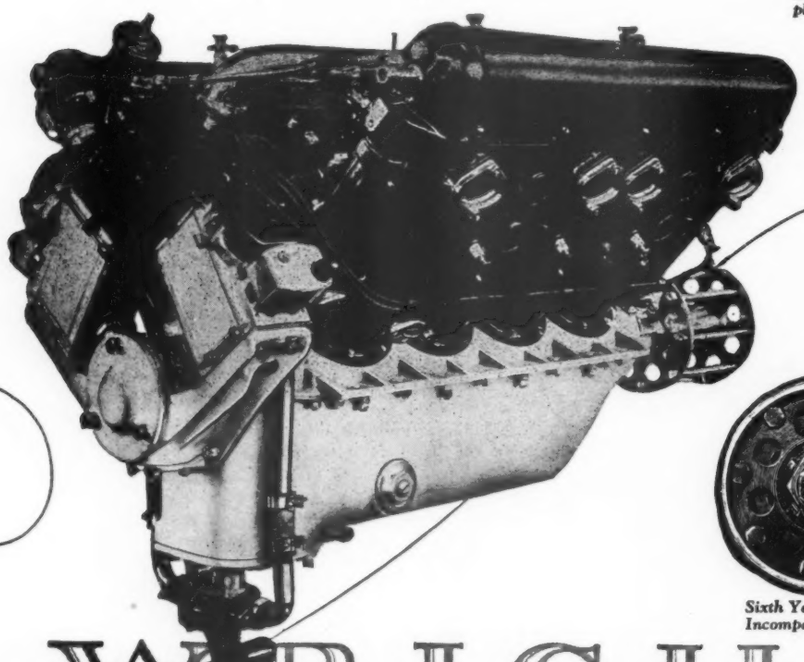

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Vol. XIV JANUARY 29, 1923 No. 5

Foreign Progress in Aeronautics

THE present issue of AVIATION contains an uncommonly large amount of information on the present status of aeronautics in Europe. A summary of the successful application of the seaplane to transport problems in little developed countries, the strength of some European air forces, secret British aircraft development and aircraft movements at the Paris airport are the outstanding subjects dealt with.

The juxtaposition in a single issue of the varied phases of foreign air activities will enable our readers to judge for themselves what a vast difference there is between the situation in Europe and in the United States. Little Belgium finds its fourteen aero squadrons inadequate for its present needs, and is reorganizing its air force; the British Royal Air Force (which does not include the Dominion air forces) is increasing its peace time establishment from 33 to 45 squadrons; France, with 128 squadrons aims to have 220—and our own Army Air Service has to be content with *twenty-one* full strength squadrons. More and more the air forces are becoming the first line of defense of European countries; here they still are considered as adjuncts of the Army and the Navy.

In the commercial field we witness the same dissimilarity between Europe and America. One million pounds of airborne merchandise passed through the single airport of Paris in the past twelve months—a threefold increase over the previous year—and this does not include the very important aircraft movements between France and Morocco, which have their terminus in Toulouse. This million pounds of merchandise was carried by aircraft because the merchants understood the value of fast transportation.

What have we in this country to place alongside of such practical air transport? Despite its nearly perfect running, the Air Mail Service is practically unknown to 99 per cent of our population. Hence there is no volume of demand for air mail carrying. Hence, with every recurrent fiscal year the Air Mail is threatened with obliteration by Congress. The fifty million letters it carries in a year are not carried because the people demand it. Most people are simply unaware of the fact that a letter *was* carried by air.

Why is not the Air Mail better advertised?

Possibilities of the Hot-Air Balloon

INTEREST in the practical possibilities of the hot-air balloon, or *montgolfière*, has recently revived in France, the mother country of lighter-than-air craft. The greatly increased cost of coal gas, not to speak of hydrogen, has so much curtailed French free balloon activities that some aeronauts are now endeavoring to turn the difficulty by re-introducing the time honored *montgolfière*.

As those familiar with aeronautical history know, the first spherical balloon, built by the Montgolfier brothers was lifted by heated air which was produced by burning damp straw under the open neck of the envelope. On later *montgolfières* there was a grate in the center of the circular gallery which carried the aeronauts, and this enabled the balloon to lift its fire and prolong the duration of flight. But no *montgolfière* ever made a very long flight, for straw fire has a very small calorific power, and the lift of the balloon quickly decreases as the temperature of the contained air drops. Besides the open fire place greatly adds to the fire hazard, several serious accidents having been caused thereby.

The new champions of the *montgolfière* propose to overcome these two drawbacks by the use of perfected oil burners which would give a much greater lift (about 10,000 calories per kilogram of fuel) than straw fire and by making the envelope of fire-proof fabric. It is contended that even though in practice the lift of heated air will be much less than that of the best coal gas obtainable (20 lb. per 1000 cu. ft. as against from 30 to 50 lb.) it will be sufficient for sport purposes, while the fuel carried on board will insure a uniform temperature of the contained air, and so afford the possibility of long flights.

It is interesting to note that the *montgolfière* survived as a type to as late a date as 1864, in which year the French aeronaut Godard built a hot-air balloon of 494,000 cu. ft. capacity. This craft carried eight passengers on one occasion and was the largest hot-air balloon of its kind ever built.

Correcting a Misleading Term

THE aircraft survey questionnaire issued by the United States Tariff Comission affords aircraft manufacturers an excellent opportunity to assist the movement in favor of a general application of the N.A.C.A. standard aeronautical nomenclature. The questionnnaire asks among others:

"Is the wording of tariff paragraph 370 open to any misinterpretation, or is the designation sufficiently clear and definite?"

To this every manufacturer who fills out the questionnaire should answer that it is open to misinterpretation in that said paragraph covers "airplanes, *hydroplanes* and parts of the foregoing."

As everybody in the aircraft industry and in the motor boat industry knows—both industries are equally interested in this—a "hydroplane" is a *gliding boat*, and not an airplane equipped for use over the water. *Seaplane* is the correct term which describes the latter. Hence the wording of the law is anything but clear and definite, and the misinterpretation which may result therefrom should be prevented by the use of the correct term.

Foreign Air Transport by Seaplane

Belgian Congo, Republic of Colombia and French Guiana Afford the Principal Fields of Activity

By Ladislas d'Orcy

Little is known in this country of foreign civil seaplane transport services. As a matter of fact, their number is small, and their operations, barring a few exceptions, are of limited extent. According to the latest available records there are, including the Aeromarine Airways, altogether five regularly operating seaplane transport services in the world.

European and African Services

In Europe there is the French *Compagnie Aéronavale,* which operates Liorè & Olivier flying boats between Antibes, France, and Ajaccio, Corsica, a distance of 150 miles. This service is to be extended by way of Sardinia to Bizerte, Tunis, when it will have a length of 700 miles. The *Svenska Luftrafik A. B.,* a Swedish firm which in 1921 ran a seaplane service between Stockholm and Helsingfors, Finland, has discontinued this service, and the *Aeromaritima Mallorquina,* which in 1921 operated flying boats between Barcelona, Spain, and Palma de Mallorca, has done likewise. A British firm, the British Marine Air Navigation Co. of London, will, it is reported, open next spring a regular service between Southampton, Cherbourg and the Channel Islands, using Supermarine flying boats. The length of this route is about 120 miles.

In Africa we find the Belgian government maintaining a passenger and mail service in the Belgian Congo, Farman G.L. flying boats connecting Kinshasa and Stanleyville, following the course of the Congo river. This service has considerable practical utility, for it enables passengers and mails to cover the 1100 mile distance in three days whereas the other available means of communication require many weeks.

In the Western hemisphere three seaplane transport companies maintain active and regular operations: In North America one, the Aeromarine Airways, already mentioned; and in South America two, the *Compagnie des Transports Aériens Guyanais,* in French Guiana, and the *Sociedad Colombo-Alemana de Transportes Aereos,* in the Republic of Colombia. The French firm, known as the "T.A.G." operates Farman G.L. flying boats and Bréguet float seaplanes a'ong the coast from Cayenne to Saint-Laurent, and thence into the interior, following the Maroni river, the terminus being Inini. The total length of these routes is about 300 miles. Here aga'n, as in the case of the Belgian Congo, the inadequacy of modern transport facilities other than aerial ones greatly favors the air line, which is not only used for carrying mails and passengers, for valuable ores are often shipped by air from the mines in the interior.

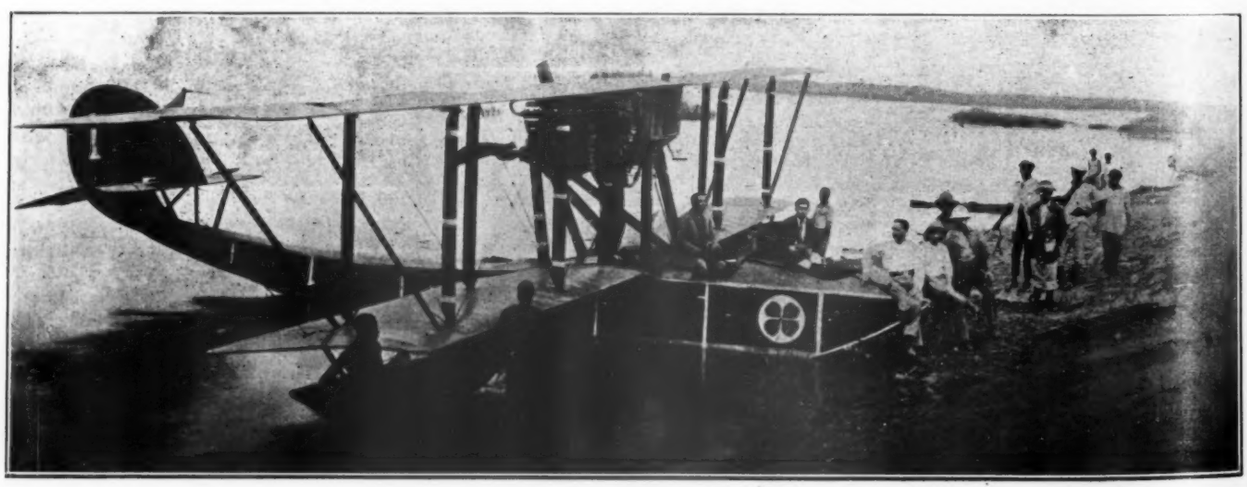
It would be interesting to compare detailed operating figures of the various seaplane services, and also their experiences inasmuch as they take place under various climates and local conditions. Unfortunately, this information is not readily available. We have, however, recently received from the *Sociedad Colombo-Alemana de Transportes Aereos,* which is popularly known as the SCADTA, some very interesting information and photographs of their operations, and these are reproduced on the next page.

The SCADTA and its Achievements

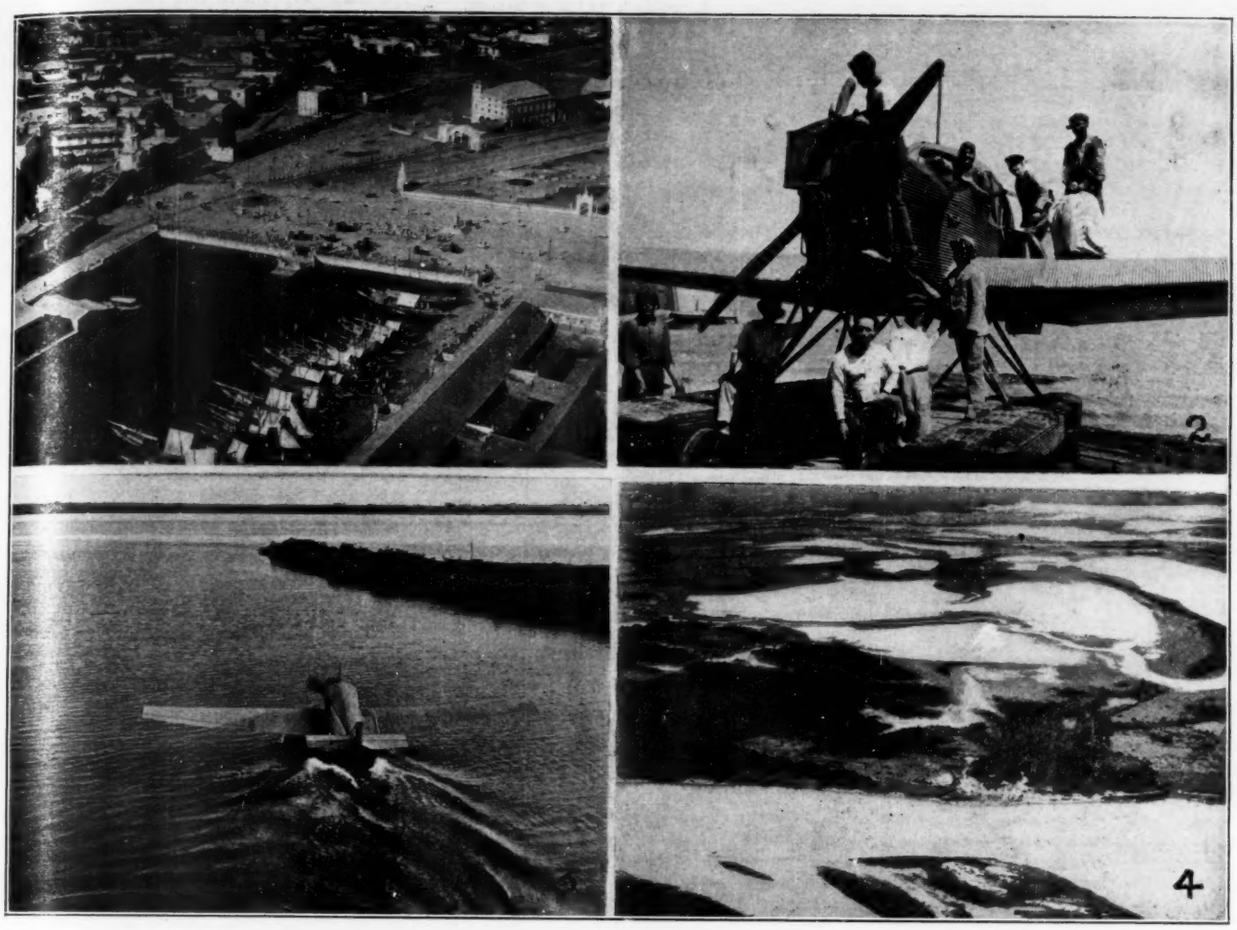
The SCADTA was founded in December 1919 at Baranquilla, Colombia, by a group of Colombian and German businessmen for the purpose of operating an air service between the Atlantic coast and the capital, Bogotà, which is situated some 750 miles in the interior. No through-going railroad exists between the capital and the coast, the only modern conveyance consisting of river steamers which follow the Magdalena river up to Girardot, whence a railway leads to Bogotà. The trip requires under most favorable conditions eight days and nights.

In October, 1920, two Junkers cabin monoplanes equipped with floats, which the SCADTA had purchased in Germany, arrived in Baranquilla and flew up the Magdalena river to Girardot, thus demonstrating the possibility of the enterprise. Almost a year passed before a regular service could be inaugurated, for no ground organization existed, and it was only in September, 1921, that a regular weekly service was inaugurated between Baranquilla and Girardot (620 miles) and Girardot and Neiva (100 miles). Later a weekly service was organized between Baranquilla and Cartagena, along the coast (a distance of 75 miles), and more aircraft were added to the fleet of the company. This now consists of six Junker float monoplanes, two Fokker monoplanes and a Handley-Page flying boat.

An interesting feature of this service is that is is not directly subsidized by the Colombian government. Instead of receiving a subsidy proportional to the number of passengers and weight of mails carried, as applies in many European



Farman G.L. passenger flying boat (300 hp. Renault engine), used by the King Albert Airline which operates on an 1100-mile route in the Belgian Congo, Africa



Air transport in Colombia: Fig. 1—Aerial view of the harbor of Cartagena. Fig. 2—Passengers and mails are taken on board a seaplane of the SCADTA. Fig. 3—Taking off. Fig. 4—Portion of the Magdalena river with lagoons, a typical bit of scenery of this air route

countries, the SCADTA holds a franchise from the Colombian government, under the terms of which the company is empowered to collect, carry and distribute mails and issue its own air mail stamps. The air mail postage is 30 cents for every 15 grams of first class mail (letters), and of this 10 per cent reverts to the government. The passenger fare from Baranquilla to Bogota is $35.00 (Colombian) for a one way trip.

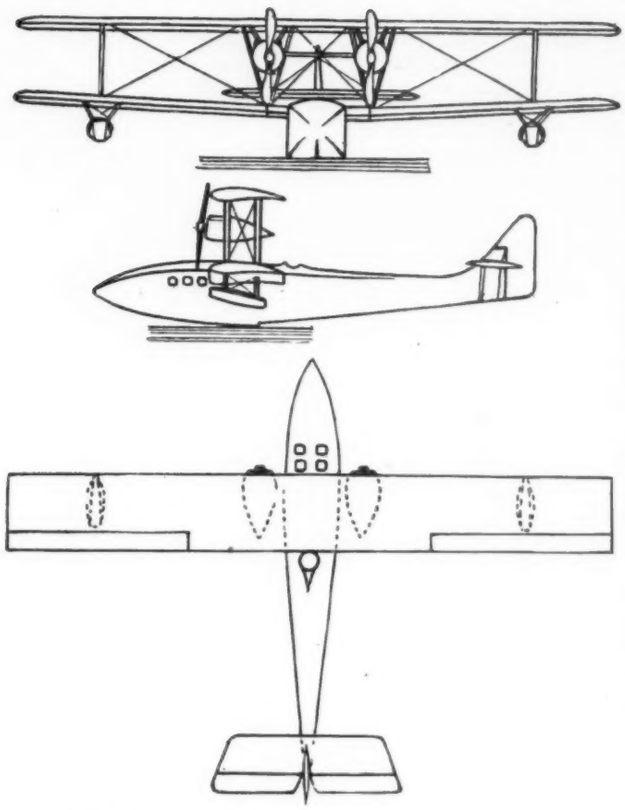
The adaptation of the aircraft of the SCADTA to the peculiar climatic conditions of Colombia took a year and a half. This work of adaptation, the company states, was based on scientific methods and proved very expensive, resulting from continual experimenting. The all-metal Junkers monoplanes, which form the bulk of the air fleet had been constructed for European conditions, and at first they gave in Colombia much poorer results than they had in Germany. They have now been adapted to local conditions as the result of lengthy experiments, and the machines perform exactly as they do in Europe. The pay load of these ships is 350 kilograms, or from four to five passengers.

A very remarkable feature of this service, on account of the special climatic conditions prevailing, is the regularity achieved in operation. Out of 200 trips made on the 750 mile route from Baranquilla to Girardot only three have not been made the same day, the delay being due to minor engine trouble. The record of safety has also been very satisfactory, not a single passenger or pilot having been killed or injured so far. The company attributes this excellent showing, which is particularly notable on account of the country's lack of ground facilities, to the use of seaplanes which continuously follow the natural waterways and so are always within gliding distance of a safe landing place.

On the outward bound flights, from Girardot to Baranquilla, not a single connection with mail steamers was missed in the 200 trips mentioned. From these figures it may be seen that the SCADTA is justified in claiming that its service compares favorably with that of the best organized European air transport companies. The accompanying table gives some interesting data on the operations of the SCADTA for the first six months of 1922.

PERFORMANCE TABLE, JANUARY-JUNE 1922 OF THE "SCADTA" AIRLINE

Month	*No. of flights*	*Time flown*		*Distance*	*Mails*	*Parcels*	*No. of Passengers*	*Useful Weight*
		hr.	*min.*	*km.*	*kg.*	*kg.*		*kg.*
Jan.	45	130	36	16,450	331.5	67.5	79	5,396
Feb.	27	89	19	10,820	224.5	104	35	2,706
March	32	128	38	16,440	268	371	66	5,909
April	38	120	05	15,670	298	106	72	4,631
May	44	103	05	13,000	350	45	72	5,459
June	49	141	35	19,990	361	66	97	7,217
Total	235	713	18	92,370	1,823	759.5	421	31,318



From *Les Ailes*

Outline drawings of the Lioré-Olivier H13 commercial flying boat (2-150 hp. Hispano)

Recently the chief pilot of the company, Von Krohn, flew from Baranquilla to Cali by following the Cauca river, a distance of 750 miles which he covered without a stop in 7 hr. 45 min. Cali is the terminus of a railway running to the Pacific coast, and as no railway service exists between Western Colombia and the Atlantic coast, an attempt to connect these far flung regions by an air transport service offers interesting possibilities.

The SCADTA also intends to operate a coastal service between Baranquilla and Santa Marta.

In addition to its flying department, the SCADTA has created a scientific department at Bogotà. This department has charge of meteorological observation for the transport service, and it also engages in aerial photography and map making. Recently this department made an aerial photographic exploration of some 1000 sq. kilometers area for the Tropical Oil Co., a local concern, and an aerial survey of the mouth of the Magdalena river. American companies intend to develop the latter with a view to improving navigation, and the map made by the SCADTA, which was taken to New York, served as the basis of the negotiations.

Equipment of Different Companies

A comparison of the equipment used by the various foreign seaplane transport companies is of great interest.

Most firms—excepting in particular the SCADTA—employ surplus war equipment, suitably modified for civil requirements. Despite the obvious uneconomic character of this *matériel*, which was designed for war service and not for civil uses, results have on the whole been satisfactory.

Converted war equipment is also used by the T.A.G. Air Line which operates in French Guiana, and the King Albert Air Line, in the Belgian Congo. Farman G.L. flying boats are used in both services, and the T.A.G. also uses Bréguet float cabin biplanes.

As both these companies operate in tropical regions, their experience with regard to the durability of wood-and-fabric machines in these latitudes is interesting. After two years of operations, both companies are convinced that only metal aircraft will give entire satisfaction, for wood and canvas are seriously affected by the great heat, the humidity and the large variation in temperature of the tropics. Wings and tail surfaces lose their alignment; exposed struts warp; wooden hulls are attacked by rot and animal growth. Hence, their use is not recommended in tropical climates. To protect the wooden hulls, metal sheathing was tried, but was found unsatisfactory, for water would seep in between the sheathing and the planking, and rot the wood. As a result of these experiences the T.A.G. has ordered from the Dits-Moineau firm an all metal flying boat, the hull of which is of aluminum bronze. It is hoped that this machine will show better wearing qualities than the equipment now used.

The Farman G.L. flying boat was developed in 1917 for patrol service with the French navy. Its characteristics, which follow, are given here to permit of comparison with other seaplanes used on civil air routes.

SPECIFICATIONS OF THE FARMAN G. L. FLYING BOAT

Engine	300 hp. Renault.	Weight empty	3190 lb.
Span	61 ft. (top).	Useful load	2200 lb.
	40 ft. (bottom).	Pay load	880 lb.
Length	42 ft.	Weight loaded	5380 lb.
Height	12.7 ft.	Max. speed	90 m.p.h.
Wing Area	734 sq. ft.	Range	300 miles

The *Aéronavale* company, which operates a three-weekly mail and passenger service between France and Corsica, started its operation with Donnet-Denhaut three-seater flying boats equipped with 300 hp. Renault engines. The characteristics and performance of these boats are similar to those of the Lévy-Le Pen type, both types having done patrol duty with the French navy during the war.

The Liore & Olivier Flying Boat H13

Recently the *Aéronavale* company placed into service a new type of flying boat, the Lioré & Olivier H13, which was specially built for commercial uses. This type is an interesting example of how a flying boat of orthodox externally braced biplane design can be improved through sheer refinement in details.

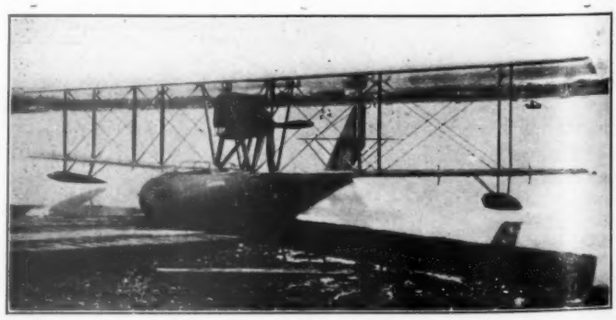
The characteristics of the Lioré & Olivier H13 flying boat are as follows:

SPECIFICATIONS OF THE LIORE & OLIVIER H13 FLYING BOAT

Engines	2-300 hp. Hispano.	Weight empty	3520 lb.
Span	52 ft. 9 in.	Weight loaded	4950 lb.
Length	38 ft.	Pay load	1100 lb.
Height	12 ft. 3 in.	Max. speed	100 m.p.h.
Wing area	626 sq. ft.		

It is interesting to compare the L & O H13 with the HS2L. The latter—which dates back to 1917—carries in commercial service four passengers and a pilot with a 400 hp. Liberty, 803 sq. ft. of wing area, and a maximum span of 74 ft. Its weight, fully loaded, is 6300 lb. The H13, which weighs about 1300 lb. less, carries with 626 sq. ft. of wing area, a maximum span of only 53 ft., and 300 hp. fractioned into two power units, four passengers, a pilot, a navigator, a radio room and a baggage compartment.

The accompanying outline drawings will show—in part at any rate—how such a performance was achieved. The bracing of the wing cell is of the simplest, consisting of the two engine structures and of two pairs of interplane struts. The general design has clean straightforward lines, with parasitic



The Savoia S16bis combination military and commercial seaplane

resistance reduced to a minimum. The wings are of orthodox two-longeron and rib construction, of spruce and fabric covered. The hull, which weighs 880 lb., is built up of four ash longerons, and a number of transverse frames, with multiply planking. For colonial service a two-ply mahogany planking is substituted for the multiply.

Finally, mention should be made of the Savoia 16bis flying boat, which was used on the now suspended services between Stockholm and Helsingfors, and between Barcelona and the Balearic Isles.

The Savoia 16bis, too, is an example of well refined straightforward design. This pusher biplane boat accommodates five passengers and a pilot when equipped for commercial purposes. Fitted for military service, the 16bis is primarily an observation and bombing machine. The type has given numerous proofs of its sturdiness and flying qualities. During the winter 1921-22, twelve such machines were flown by the Italian pilots Maddalena, Guarnieri and Conforti from Sesto Calende, on Lake Maggiore, to Barcelona, Spain, where they were delivered to the Spanish naval air service.

The specifications of the Savoia 16bis are as follows:

SPECIFICATIONS OF THE SAVOIA 16bis FLYING BOAT

Engine	300 hp. Fiat.	Weight empty	3753 lb.
Span	50 ft. 10 in.	Useful load	1658 lb.
Length	32 ft. 8 in.	Weight loaded	5411 lb.
Height	12 ft.	Max. speed	102 m.p.h.
Wing area	741 sq. ft.	Endurance	6 hr.

Progress of Commercial Aviation in France

Impressions of W. W. Kellett

W. Wallace Kellett, American representative for Henry and Maurice Farman, recently returned from an extensive tour of Europe. He is greatly impressed with the progress made abroad in civil aeronautics, and with the comparative inactivity he finds in this country.

"The thing which impressed me most on the other side," said Mr. Kellett, "was the fact that all the flying they do there is properly controlled and regulated and they are really getting something out of it and getting somewhere. Comparing our Aviation with theirs is something like comparing the maneuvers of a trained army with those of a mob. All the incidents which occur in their operating are properly reported, checked up and used to advantage and of course every accident is thoroughly investigated and steps taken to prevent similar occurrences. I think we have come to a point where we can consider as criminal negligence, the inexcusable delay on the part of Congress in not passing air laws and establishing a department of Aeronautics with a substantial budget to administer the laws and promote flying throughout the country.

"The perfection of the air transport lines which I note from year to year as I travel over them is quite apparent. The machines in France, England and Belgium are now equipped by law with wireless telephones. The ground organization has been brought to a point where it provides the pilots, first, with good machines, and second, with excellent indications as to the weather and flying conditions along their air route. It is only by experience that the many ground stations and emergency land fields on the routes have been established and that the personnel has been properly regulated. We might appropriate $100,000,000 for airplanes and have them within a year but no amount of money would buy one year's experience in properly operating them. Air transport is now a real science on the other side.

"One of the most interesting departments of the French Bureau of Aeronautics is the Department of Propaganda which, in addition to publicity, is charged with the conduction of flying meets. This Department co-operates with the Aero Clubs in various cities, local Chambers of Commerce, the Army and Navy to stage these meets. That they are on the job is demonstrated by the fact that every week in France, there are from three to six quite decent flying meets which are attended by thousands of people. Needless to say, all participants receive expenses and prizes in addition.

"There is no doubt that the French air force is the most up to date and best equipped in the world at the present time. This is now openly acknowledged by England, and they are coming to life again there and will surely do more within the next few months than they have done for some time.

"There is a great deal more flying done in Switzerland than one would believe. Interest there is very keen and flying meets are held in the larger cities with either German, French or Swiss taking part. With their usual efficiency, the Swiss accomplish a great deal with their limited means. Contrary to general opinion, there are many landing fields in Switzerland and it is possible to fly safely over almost the entire country. This is because there are beautiful fertile valleys between most of the high mountains.

"I like the way the French run their aviation. Everything that can possibly be done by civilians is given to civilian companies. The Bureau of Civil Aeronautics is divided into three departments, the *Service Technique,* Service of Construction and the Service of Air Transportation.

"Both the Army and the Navy must request new designs from the *Service Technique,* which as an impartial body, endeavors to fulfill the requirements submitted to them. All the manufacturers are consulted without favor. When a successful design has been approved it passes to the Service of Construction, and the Army and Navy must enter all orders for machines through this Service. The Service of Construction arranges for the manufacture either with the designer or any company, but always impartially. It is obvious that this system brings a good deal of civilian strength into the aircraft business, and does away with any petty jealousies which might exist in military circles.

"As for the Farman factory, it is quite busy with over 3,000 men employed. Our Giant BN4 four-motor Bomber has just passed its official test satisfactorily. We are building flying boats, Goliaths and new all metal planes, which are successful, and some experimental types. As commercial types, we still have the Goliath, which is now in universal service on French airlines and our 1923 model Sport Farman which contains some improvements over our last year's model. The Farman Brothers are still flying daily and enjoying every minute of it as they have for the past twelve years."

Aircraft Movements at Le Bourget Airport

The French Under-Secretary for Aeronautics has issued the following statistics on the arrivals and departures of aircraft at and from Le Bourget Airport, the aerial terminal of Paris. The figures for 1919 only include the period from Aug. 25 to the end of the year.

	1919	1920	1921	1922
No. of Aircraft	485	3,359	4,206	4,812
No. of passengers	699	10,215	18,166	19,974
Merchandise (kg.)	6,882	120,785	150,000	463,970
Mails (kg.)	NIL	1,473	3,316	3,445

It should be noted with reference to the above figures that the year 1922 was remarkable in France for the bad weather, flying being suspended at Le Bourget thirty-five days of the year, whereas the previous year only eighteen days were non-flyable. The increase in passengers, merchandise and mails is only the more remarkable, the weight of merchandise carried having more than trebled during the year.

The Civil Aeronautics Act of 1923

Abstract of Bill Introduced in the House by The Hon. Samuel H. Winslow of Massachusetts

The Bill "to create a Bureau of Civil Aeronautics in the Department of Commerce, encourage and regulate the navigation of civil aircraft, and for other purposes" (H.R. 13715) which was introduced in the House of Representatives on Jan. 8 by the Hon. Samuel H. Winslow of Massachusetts, is in its essential provisions as follows. Quotations from the Bill are printed in current type; abstracts of provisions in smaller type.—EDITOR.

TITLE I—SHORT TITLE AND DEFINITIONS

Title I, Short Title and Definitions, gives the short title of the Act as the "Civil Aeronautics Act of 1923", and defines the meaning of the terms Secretary, Commissioner, Bureau, United States, Aircraft, Public Aircraft, Civil Aircraft, Aircraft of the United States, Person, Airdrome, Air Navigation Facility, Civil Air Navigation Facility, Master, Airman, Domestic Corporation, and Citizen of the United States.

(f) The term "public aircraft" means (1) an aircraft navigated by the military or naval forces, including the Coast Guard, or the Air Mail Service of the United States, or by the Advisory Committee for Aeronautics, (2) or a Government aircraft used exclusively in the public service of a foreign country.

(g) The term "civil aircraft" means any aircraft other than a public aircraft.

(j) The term "airdrome" means any area or supporting surface, including structures anchored thereto or floating thereon, used or purposely adapted for the storage, maintenance, or repair of aircraft navigated by individua's who are on board the craft; except any such area or structure which is not operated for profit and which is used by the owner or tenant solely for the storage, maintenance, or repair of aircraft exclusively for the personal use of himself, his family, and guests.

(k) The term "air navigation facility" includes any airdrome, emergency field, air signal structure, or aerial beacon in the United States.

(l) The term "civil air navigation facility" means any air navigation facility except one operated by the military or naval forces of the United States, including the Coast Guard, or by the Advisory Committee for Aeronautics.

(m) The term "master" means the individual having command of an aircraft.

(n) The term "airman" means any individual (including the master and any pilot, mechanic, or member of the crew) engaged in the navigation of aircraft while under way, and any ground engineer engaged in the inspection, overhauling, or repairing of aircraft.

TITLE II—DOMESTIC AIR NAVIGATION

Title II, Domestic Air Navigation, consists of six parts.

PART 1—BUREAU OF CIVIL AERONAUTICS

ESTABLISHMENT OF BUREAU

Part 1 deals with the establishment of the Bureau of Civil Aeronautics, the general powers of the Secretary and the Commissioner. Annual Reports, the Detail of the Army, Navy and Coast Guard Officers for service in the B.C.A. and provides for a temporary appropriation up to July 1, 1924.

SEC. 201. The Secretary shall encourage, foster and promote civil aeronautics in every possible manner, and do all things necessary therefor. For such purposes there is established in the Department of Commerce a bureau to be known as the Bureau of Civil Aeronautics under the direction of a Commissioner of Civil Aeronautics, who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall receive a salary of $7,500 per annum. Except as otherwise specifically provided, the administration of all functions authorized by Title II or III of this Act, or by regulations of the Secretary made thereunder, is vested in the Commissioner under the supervision of the Secretary.

GENERAL POWERS OF COMMISSIONER

SEC. 203. The Commissioner, with the approval of the Secretary, is authorized—

(a) To make such expenditures authorized by law (including salaries, travel, per diem rates of allowance in lieu of subsistence, the purchase, maintenance, operation, and repair of aircraft and facilities thereof, printing and binding, law books, books of reference, periodicals, rent, and contingent and miscellaneous expenses) as may be necessary efficiently to execute the functions authorized by Titles II and III as may be provided for by the Congress from time to time;

(b) To publish from time to time a bulletin setting forth all licenses and permits issued or revoked under the provisions of this Act, together with field reports of all civil aeronautic activities, accidents, field and route data, and such other matters relating to the functions authorized by this Act as he deems advisable; and

(c) To publish the treaties and laws of the United States relating to civil aeronautics and regulations issued thereunder, and collect and publish at least anually in the bulletin provided for in subdivision (b), all important court and administrative decisions in respect of such treaties, laws, and regulations, together with an index-digest thereof cumulated from time to time.

DETAIL OF ARMY, NAVY, AND COAST GUARD OFFICERS

SEC. 205. (a) The Secretary of Commerce may, whenever in his judgment he deems it advisable, request the Secretary of War, the Secretary of the Navy, or the Secretary of the Treasury to detail officers from the Air Service, the Air Service Officers' Reserve Corps, or the Office of the Chief of Air Service of the War Department, or from the Bureau of Aeronautics of the Navy Department or class 5 of the United States Naval Reserve Force, or from the Coast Guard in the Treasury Department, respectively, for service in the Bureau of Civil Aeronautics. If such request is complied with any officer so detailed shall be subject to the direction and control of the Secretary of Commerce in carrying on the service for which he is detailed. No officer shall, by reason of such detail, suffer any loss in military or naval grade, rank, or status.

TEMPORARY APPROPRIATION

SEC. 207. For expenses in the administration of the functions vested in the Secretary or the Commissioner by this Act, there is hereby authorized to be appropriated the sum of $375,000 to be available for such expenses incurred prior to July 1, 1924.

PART 2—AIRCRAFT OF THE UNITED STATES

Part 2, Aircraft of the United States, gives the scope of regulations, and makes provisions for the registration, identification and safety inspection of aircraft, and for the unlawful navigation of aircraft and the exemption from regulation of certain kinds of aircraft.

SCOPE OF REGULATIONS

SEC. 221. Inasmuch as air navigation is a unit and does not regard State lines, and the elements thereof ordinarily subject to regulation by the States are so mingled with those elements subject to regulation by the Federal Government, that the Federal Government can not effectively regulate, prevent interference with, and safeguard interstate and foreign commerce by air navigation without incidental regulation of intrastate commerce by air navigation and of air navigation for other than commercial purposes, the provisions of this title shall apply in respect of all air navigation in the United States, and to aircraft and airmen engaged, and to air navigation facilities used, in such navigation.

REGISTRATION

SEC. 222. (a) The Secretary shall by regulation provide

for the registration of aircraft as civil aircraft of the United States; but no aircraft shall be so registered unless (1) it is not registered under the laws of any foreign country, and (2) it is a civil aircraft owned by a citizen of the United States. Any aircraft registered shall be issued a certificate of registry.

IDENTIFICATION

SEC. 223 The Secretary is authorized by regulation to provide for the identification and marking of civil aircraft in the United States.

SAFETY INSPECTION AND REGULATION OF AIRCRAFT AND AIRMEN IN THE UNITED STATES

SEC. 224. In order to safeguard life and property and protect air commerce and navigation, but for no other purpose, the Secretary is authorized by regulation to—

(a) Publish for the information of the aircraft industry standards of design, construction, repair, maintenance, and equipment, including safety and signal equipment and accommodations for crew, passengers, and merchandise, for civil aircraft and air navigation facilities.

(b) Provide for the inspection and testing from time to time of civil aircraft in the United States, as to their airworthiness. Civil aircraft found upon such inspection and test to be airworthy shall be issued a certificate of airworthiness.

(c) Provide for the inspection and testing from time to time of civil air navigation facilities in the United States, as to their suitability for safe and efficient use by aircraft. Civil air navigation facilities found upon such inspection and testing to be suited for such use shall be issued an air service certificate.

(d) Provide for the navigation of aircraft in the United States rules of the air, including rules for taking off and alighting; signals for the conduct and protection of air navigation in the United States including signals for land and water structures, air routes, and air navigation facilities, rules as to safe altitudes of flight, the use of ballast, the use of balloon gases, and the operation of anchored aircraft in the United States; rules for the navigation of aircraft upon waters within the United States; and rules for the prevention of collisions between vessels and aircraft upon such waters.

(e) Provide for the examination and determination of the qualifications of individuals to serve as airmen upon or in connection with civil aircraft in the United States. Such examination shall be based upon the character, physical fitness, training, and practical experience of the airman. Any individual found, upon such examination, to be qualified shall be issued an airman's certificate.

(f) Provide for the maintenance of log books for civil aircraft in the United States.

PART 3—ESTABLISHMENT OF AIR ROUTES AND AIR NAVIGATION FACILITIES

Part 3, deals with the establishment of air routes and air navigation facilities.

SEC. 231. The Secretary is authorized to designate and approve air routes suitable for air commerce in the United States. The Secretary is further authorized, within the limits of appropriations hereafter made by the Congress, (1) to establish, construct, repair, maintain, equip, and operate air navigation facilities upon any such route, whenever he finds that the existing air navigation facilities upon such route are inadequate for the air commerce using the route, and (2) to repair, maintain, equip, and operate air navigation facilities established or constructed by any State, Territory, or possession, or by any municipality, or other political subdivision thereof, and dedicated to the United States for public use.

SEC. 232. The Secretary is authorized to prepare and publish maps of air routes designated and approved by him under section 231.

SEC. 233. Air navigation facilities established by the Secretary shall be made available for public use and air navigation facilities under the jurisdiction of the head of any other Government establishment may be made available for public use, under such conditions and to such extent as the Secretary or the head of such Government establishment, respectively, deems advisable and may by regulation prescribe. The United States shall not be liable for any injury to aircraft occurring while the aircraft is making use of any air navigation facility under the jurisdiction of the head of any Government establishment but not established by the Secretary under this part of this title.

Part 4 authorizes the President to prescribe airspace reservations for national defense and public safety purposes.

PART 5—REPORT, ENTRY, AND CLEARANCE OF AIRCRAFT

Part 5 prescribes rules for the entry and clearance of aircraft, exempting therefrom mail carriers and aircraft operating on regular lines at least three times a week.

SEC. 252. Nothwithstanding the limitations of law upon the number of ports of entry, the Secretary of the Treasury shall designate airdromes, from among those operated by the military or naval forces of the United States or having valid air service certificates, as ports of entry for civil aircraft.

SEC. 253. Except as provided in section 254, the master of every civil aircraft arriving in the United States from a place outside the United States shall make entry at a port of entry for aircraft, and no civil aircraft shall depart from a place in the United States for any place outside the United States, unless it has received clearance at such a port.

Part 6 contains administrative provisions such as the investigative powers of the Commissioner, the issuance, suspension and revocation of certificates, civil and criminal penalties for violation of the Act, and fees to be charged for certificates.

FEES

SEC 267. There shall be paid to the Commissioner prior to each registration, identification, and issuance of a certificate under this title a reasonable fee in an amount to be fixed by the Secretary. No registration or identification shall be made or certificate issued until the fee fixed therefor has been paid. All fees and penalties paid to the commissioner under the provisions of this Act shall be covered into the Treasury as miscellaneous receipts.

PART 7—CIVIL AERONAUTICS CONSULTING BOARD

Part 7 creates a Civil Aeronautics Consulting Board, as follows:

SEC. 701. There is hereby established a board to be known as the "Civil Aeronauties Consulting Board." The board shall be composed of seven members appointed by the Secretary from representatives of the aircraft manufacturers, designers and engineers, and operators of common carriers by air. Any vacancy in the board shall be filled in the same manner as the original appointment. The members of the board shall serve without compensation, except reimbursement for traveling, subsistence, and other necessary expenses incurred in attending meetings of the board.

SEC. 702. It shall be the duty of the board (a) to establish and maintain liaison between the bureau and the civil aeronautical industry of the United States, and (b) at the request of the Secretary, to advise the Secretary, and upon its own initiative, to make recommendations to the Secretary, with respect to the solution of problems arising in civil aeronautical development or in the administration of any function vested in the Secretary or the commissioner by this Act.

TITLE III—AIR NAVIGATION LAW OF THE UNITED STATES

Title III of the Act is the Air Navigation Law of the United States. Part 1 establishes the sovereignty of the United States over its air space, the status of American aircraft upon the high seas and in foreign countries.

PART 1—INTERNATIONAL AIR NAVIGATION

SOVEREIGNTY IN THE AIRSPACE OF THE UNITED STATES

SEC. 301. The Congress of the United States hereby declares that the United States has, to the exclusion of all foreign countries, complete sovereignty in the airspace of the United States; but the provisions of this Act shall not be construed to deprive the States of sovereignty in the airspace above their lands and waters except in so far as granted to the United States as an incident to the powers delegated by the States to the United States in the Constitution.

Part 2 provides that, excepting certain specified cases, the shipping and navigation laws and rules shall *not* apply to seaplanes, and directs that Admiralty practice be followed in suits for penalties.

PART 3—LAWS RELATING TO COMMERCE GENERALLY

Part 3, Laws Relating to Commerce Generally, reads as follows:

SEC. 331. All laws of the United States which are applicable to commerce, transportation, or navigation generally shall, so far as practicable, be held applicable to commerce, transportation, and navigation by air, unless such laws are by other provisions of this Act or are by their terms specifically made inapplicable to commerce, transportation, or navigation by air or limited to commerce, transportation, or navigation when conducted by instrumentalities other than aircraft.

PART 4—LIABILITY OF COMMON CARRIERS IN AIR TRANSPORTATION

Part 4 establishes the liability of common carriers in air transportation. The principal provision is the following:

SEC. 342. (a) Any carrier receiving in the United States property for air transportation in interstate or foreign commerce (hereinafter referred to as the initial carrier) shall issue a bill of lading therefor. The initial carrier shall be liable to the holder of the bill of lading for the full amount of any loss, damage, or injury to such property if the loss, damage, or injury is caused by such initial carrier or by any subsequent carrier to which the property is delivered or over whose lines the property passes in the course of the transportation of the property on a through bill of lading. The liability imposed upon the initial carrier shall not be held to relieve the carrier actually causing the loss, damage, or injury from liability therefor.

(b) If the loss, damage, or injury occurs while the property is in the custody of a carrier by water, the liability of such carrier shall be determined under the laws and regulations applicable to transportation by water, and the liability of the initial carrier shall be the same as that of the carrier by water.

PART 5—PUBLIC USE OF NAVIGABLE AIRSPACE

Part 5 provides that the navigable airspace is a public utility, and thus free to air navigation.

SEC. 351. The use of the navigable airspace of the United States is hereby declared to be necessary for commerce among the several States and with foreign countries, for the establishment of air post offices and postal routes, and for the national security and defense; and such airspace is declared to be subject for such purposes to a public right of freedom of navigation by aircraft.

SEC. 352. Except as the Congress may hereafter provide, all airspace above the minimum altitudes specified in the rules as to safe altitudes of flight, prescribed by the Secretary under section 224, is declared to be navigable airspace.

Parts 6 and 7 include amendments to the criminal code to cover offenses committed on board an aircraft.

TITLE IV—APPLICATION OF EXISTING LAWS TO AIR NAVIGATION

Title IV applies the existing law to air navigation. Part 1 modifies the Tariff Act of 1922 by bringing aircraft under its meaning. It says among others:

SEC. 651. In such cases as the Secretary of the Treasury shall by regulation prescribe, the master of every civil aircraft which arrives in the United States from a place outside the United States carrying merchandise (other than aircraft stores) or baggage destined for a place in the United States, shall have on board his aircraft a manifest in a form to be prescribed by the Secretary of the Treasury and signed by such master under oath as to the truth of the statements therein contained. The manifest shall conform as nearly as may be practicable to the form of manifest prescribed in section 431 of this Act, and shall specify separately the aircraft stores on board the aircraft. The original and one copy of such manifest shall be delivered to such customs officer as the Secretary of the Treasury may by regulation prescribe.

Part 2 concerns the application of Public Health regulations (quarantine powers) to air navigation.

Part 3 includes air navigation in the provisions of the Immigration Act of 1917.

Part 4 amends the Narcotic Drugs Import and Export Act to bring air navigation within its provisions.

Part 5 provides that offenses against neutrality committed on board an aircraft be judged under the Criminal Code and the Espionage Act.

TITLE V—MISCELLANEOUS

Title V, Miscellaneous, deals with the Weather Bureau and the National Advisory Committee for Aeronautics, and provides that if any portion of the Act is declared unconstitutional, the remainder shall remain valid. The Act is to take effect upon its enactment.

WEATHER REPORTS

SEC. 501. Section 3 of the Act entitled "An Act to increase the efficiency and reduce the expenses of the Signal Corps of the Army, and to transfer the Weather Service to the Department of Agriculture," approved October 1, 1890, is amended by adding at the end thereof a new paragraph to read as follows:

"It shall be the duty of the Chief of the Weather Bureau, under the direction of the Secretary of Agriculture, (a) to furnish such weather reports, forecasts, warnings and advices as may be required to promote the safety and efficiency of air navigation in the United States and upon the high seas, particularly upon air routes designated and approved by the Secretary of Commerce under the provisions of section 231 of the Civil Aeronautics Act of 1923, or established under other authority of law, and (b) for such purposes to observe, measure, and investigate atmospheric phenomena, and establish meteorological offices and stations.'

ADVISORY COMMITTEE FOR AERONAUTICS

SEC. 502. The membership of the Advisory Committee for Aeronautics is increased from 12 to 14 members, to be appointed by the President. One each of the additional members shall be a representative of the Bureau of Civil Aeronautics, the Office of the Assistant Postmaster General in charge of the Air Mail Service, and the Coast Guard.

SEPARABILITY

SEC. 503. If any provision of this Act is declared unconstitutional or the application thereof to any person or circumstance is held invalid, the validity of the remainder of the Act and the application thereof to other persons and circumstances shall not be affected thereby.

Air Activities, Underwriters' Laboratories

Underwriters' Laboratories have just issued a report covering their activities during 1922, in which the following reference is made to their Aviation Department:

"This Department is now a little more than one year old. The response from the aeronautical industry has been small compared with that of other industries in older departments. But the co-operation obtained is proportional when the aeronautical activity of this country is considered.

"Our Aircraft Register shows thirty-three registered airplanes. There have been thirty-one requests for pilot's registration certificates which were acted upon as follows: twenty-nine certificates were granted, two refused and one was suspended following a crash. There were received six requests for certificates of airworthiness which were acted upon. Two are still pending, and two were refused.

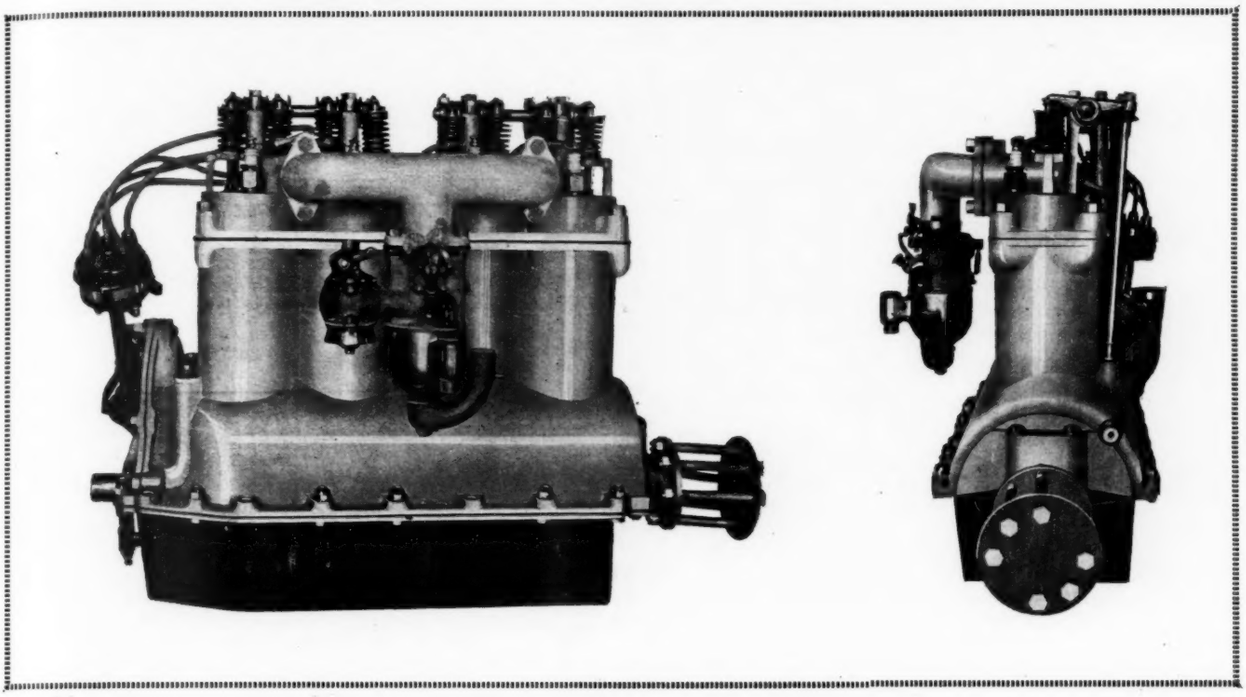
"Thirty-five men have been appointed in the various aviation centers throughout the United States to act as resident aviation engineers. These men are capable of making the required inspection of aircraft preliminary to the issuance of the certificate of airworthiness. Considering that there are no laws in this country compelling registration and inspection of aircraft and pilots, it is encouraging to note that our registers compare favorably with those of the Canadian Air Board, where registration is compulsory by law:

Registered Aircraft—Canada, 52; Underwriters' Laboratories, 33.

Registered Pilots—Canada, 71; Underwriters' Laboratories, 29.

The Rogers B4 Air Cooled Engine

Light Weight Power Plant Designed For Durability and Cheap Upkeep



Side and end views of the Rogers B4 Aircraft Engine

In designing the Rogers B4 air cooled 45 hp. vertical engine it has been the aim of the builders, Rogers Aircraft of Fort Worth, Tex., to produce at low cost a durable and efficient light weight power plant for the sport plane, ice sled or wind wagon, with inexpensive replacement parts readily available.

Direct cooling is achieved in the B4 without projecting fins, the valve springs, rocker arms, valve stems, valve cages and rocker arm parts being designed to give additional surface to carry off the surplus heat. The manufacturers claim that numerous tests have proven that the B4 cools perfectly in flight.

By having the intake valve in the head the charge is carried directly to the top of the piston, while with the exhaust valve in the head the exhaust is forced out with minimum effort, insuring cleaner scavenging than with the L head type. From the accompanying illustration it will be seen that there are no pockets on the exhaust valve head to hold the heat, nor is the exhaust held to the head as in many air cooled engines.

Connecting rods are of 60/40 carbon steel. While their weight is only 1½ lb. each, including bearings and caps, they have proven amply strong.

Dowmetal pistons are used. They are fitted with four rings, three compression and one wiper, which carries all the oil back to the crank case and prevents fouling of the plugs. Although dowmetal is about 40 per cent lighter than aluminum it is claimed to have exceptional wearing qualities, as would appear from the following enumeration of its physical properties:

Specific gravity, 1.85
Elastic limit, 14,000 lb. per sq. in.
Melting point, 1,110 F.
Tensile strength, 22-24,000 lb. per sq. in.

The piston complete with bushings only weighs 14 oz., this advantage of lightness insuring increased power and reduced vibration.

Strong, light and durable cylinders have been secured by the use of the finest grey iron. The head is also of iron. The intake is cast from aluminum, has no sharp bends and its inside measurement—1⅜ in.—is large.

The oiling system is of the splash system, without gears, pumps, tubes to clog up, etc.

Atwater-Kent battery ignition is used. Two batteries insure uninterrupted ignition in case one cuts out, insuring maximum ignition with minimum weight.

A correct mixture for all speeds is secured with the Schebler carburetor, adjusted to low, intermediate and high speed.

SPECIFICATIONS OF THE B-4 4 CYCLE MOTOR

Horsepower, 45-50
Bore, 3 13/16 in.
Stroke, 4 in.
Carburetor, Schebler, Model L
Ignition, Atwater-Kent and Hot-Shot Battery
Number of cylinders, 4
Number of valves, 8
Weight of motor, dry,140 lb.
Weight per hp., 2⅞ lb.
Gas consumption per hp. hr., .412 lb.
Oil consumption per hp. hr., .011 lb.

"Speed" Displaces "Hikko"

The Editor of the aeronautical magazine *Hikko,* organ of the Imperial Aero Society of Japan, advises that the publication will be discontinued. Beginning with January, 1923, *Speed* will take the place of *Hikko* as the official organ of the Society. The editorial office of *Speed* is at 1 Yurakucho-ichome, Kojimachiku, Toyko, Japan.

Improved Equipment for Night Flying

Flashing Aerial Lighthouses Will Show Limits of Field and Direction of Wind

The highest development of every form of transportation comes with the introduction of standard signals which safeguard traffic and regulate navigation. When the "Twentieth Century" leaves its terminal in Chicago or New York every foot of its thousand-mile run is protected by standard block signals. When the Majestic is hauled from her port in New York she is guided through the harbor by "AGA" buoys and every knot of her voyage is subject to marine rules and regulations. It is fitting, therefore, that every advantage be taken in aviation of signal practice in the marine and land traffic field.

One of the first developments in this connection was the erection shortly after the Armistice of aerial lighthouses at the Croydon airport near London for the British Air Ministry, by the Gas Accumulator Co., (U.K.) Ltd. of Great Britain, which is affiliated with the American Gas Accumulator Co., Elizabeth, N. J.

More recent reports from London indicate that London-Paris theatre service with night flights is quite within the realm of possibility inasmuch as the British Air Ministry plans soon to operate night air mail service between Croydon and Paris. In a few months it may be possible to leave London after business in the evening, dine in Paris, do a round of Montmarte and still have time for a few hours' rest before returning to his office at the usual time the next day.

The night service, which will be started in the spring, will be tried out first as an experiment, but it is intended to lay the foundation of a regular nightly service. The day service of the Continental airways already is largely used. But the postoffice authorities have found that their value as a means of transport for mails is largely discounted by the fact that there is no night service. The bulk of England's foreign mail is, in fact, that which is posted in the city at the close of the day's business.

Along the cross-Channel air route lighthouses, which throw their beams into the clouds, have been erected by the Air Ministry, and emergency landing grounds, automatically illuminated at night, are to be constructed. Already the trail from the London terminus to Lympne where the airplanes set out over the Channel is a fair blaze of light.

Landing Field Signals

News has just been received of important developments which go a step further than the first efforts of Croydon and which bid fair to have a tremendous influence on the future of aviation in this country.

The laying out of standard routes with emergency landing fields, adequately protected by signals, will safeguard night flying and open an era of expansion in the air which will be only comparable to the period of development during the past ten years in the automobile industry.

As mentioned in the Nov. 20 issue of AVIATION, an aerial lighthouse has been developed and is now in operation at Hampton Roads under the supervision of the Navy Bureau of Aeronautics. This light is visible from an altitude of several miles above the station. In addition to being a far-reaching signal light, the structure is designed to be an observation tower which is glass enclosed and protected from the elements. Much interest has been evinced in this installation and indications point to a further development of this type of aviation signal for use at coastal stations.

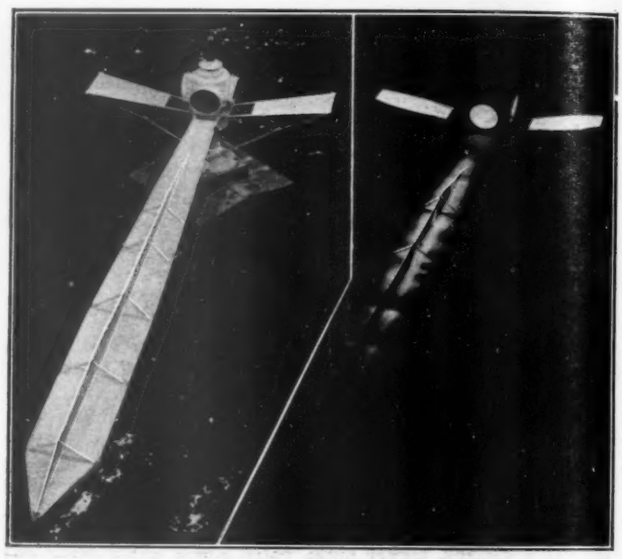
Another problem is presented in the development of transcontinental air routes, such as is now being laid out between Chicago and Cheyenne a part of the New York to San Francisco route by the Post Office Department. In this case it is necessary to have standardized emergency fields which are plainly visible by day and night.

To meet this situation the American Gas Accumulator Co. which is also actively engaged in the marine and land traffic engineering field, has developed two devices—the Field Limitation Beacon and the Ground Wind Indicator.

The plan, as outlined, calls for placing four Field Limitation Beacons which will mark the limitations of the emergency landing field. These beacons will be clearly visible from the air and are operated according to the same principles as the marine beacons and Lighthouses. They are automatic in their operation and will burn for a period of six months without attention. They will enable the aviator accurately to gage the dimensions of the landing field.

"AGA" Ground Wind Indicator

Inasmuch as the Field Limitation Beacons are intended to be visible for only a short distance, it is necessary to have a strong light which will be visible for 12 to 15 miles, thus enabling the location of emergency landing fields at regular intervals at 20 to 25 miles apart. As illustrated the AGA Ground Wind Indicator is constructed in the form of the letter T conforming to the style internationally agreed upon for the indication of landing zones and will be visible as a day and night indicator from the sky. The Ground Wind Indicator resembles a small airplane which rotates automatically and which will always be head to the wind.



Ground Wind Indicator, AGA type, as it appears in daytime and by night

The direction of the Ground Wind Indicator will be visible when the aviator is three to five miles from the field. By having these lights located in the same position in each field, the flier will be able accurately to gage his landing from the location of the light.

The Ground Wind Indicator is a combination of marine lighthouse and dummy airplane with aluminum wings or vanes. The particular advantage of the Ground Wind Indicator developed by the American Gas Accumulator Co. is that no personnel is required to insure its dependable operation. The flashing light is operated according to the same principles as the marine beacons which will be found off the coast of Alaska and which in many cases burn for two years without further attention.

The AGA Wind Indicator is mounted upon a small substructural housing which contains the accumulator tanks which are recharged at definite intervals. This will place the light about ten or twelve feet above the ground, in order to

avoid the ground eddys as far as possible. The light will flash and be alternately one second lighted and one second dark.

The tail of the "T" will be 21 ft. long and about 12 in. wide at the lighted extremity, and widening to about 24 in. at the full length. The shorter members forming the cross of the "T" will each be 4 ft. long by about 20 in. at the outer ends, and tapering to 12 in. at the lighted end. The lantern and the vanes of the indicator are mounted on ball bearings and are free to rotate about a vertical axis. Thus the "T" will always be held head to the wind.

The Sunvalve

The sunvalve is the unique device mounted on top of the "AGA" Ground Wind Indicator. It automatically turns off the flashing light in the daytime and turns it on at night or during periods of low visibility. It is operated by the action of solar radiation and is so designed as to be operative under any temperature changes. Briefly, the system employed, is that a central black body is surrounded by highly polished pillars; light, and therefore heat, falling upon these elements is absorbed by the black center and reflected by the outer gilt columns. Consequently the black portion expands under the influence of light to a greater extent than the polished elements; this difference in expansion is utilized to open and close a gas valve, turning the light off and on according to the prevailing degree of light and darkness. A valve of this type brought the British Croydon light into action during the last eclipse of the sun.

The light power, projected upon each of the three vanes through the dioptric lens, is equal to 27,000 candlepower. It can be seen as a day signal at a range of about 5 miles when observed from normal flying heights. As a flashing light without definite shape, it can at night be seen from about 12 miles and its shape and the direction of the wind can be clearly established from a distance of two to three miles.

Installation at Dayton Field

The Ground Wind Indicator, together with the set of four Field Limitation Beacons marking the limitations of the field, are now being installed at McCook Field, Dayton, Ohio, for the Army Air Service. This unit also has been studied by the Post Office Department for adoption at their emergency landing air route fields and, if approved, will be recommended for the Chicago-Cheyenne route to equip all emergency landing fields.

The Ground Wind Indicator which has been in service on the London-Paris route has given complete satisfaction.

New Pioneer Flight Indicator

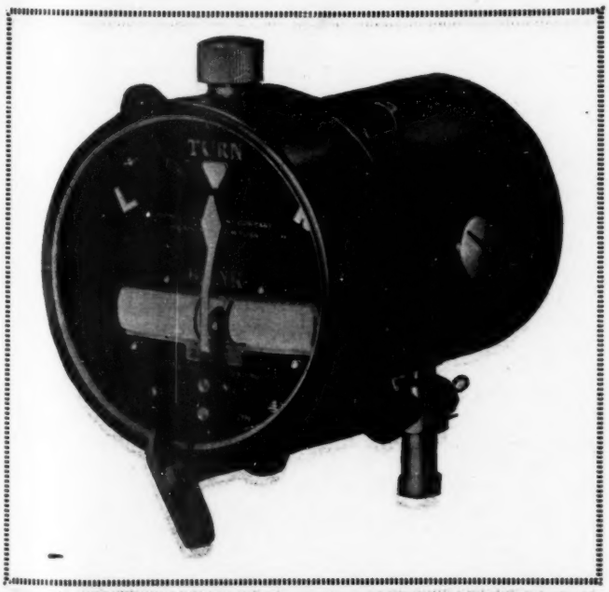
A Combined Bank and Turn Indicator of Small Size and Light Weight

The Pioneer Instrument Company's latest model Flight Indicator, (which is a combined Turn Indicator and Bank Indicator) is shown in the accompanying illustration. This is much smaller in size and weight than earlier models. The bezel is but 2¾ in. in diameter, and the weight is under 18 ounces. Turns are indicated by the movement of the hand to the right or left, and the banking indication is given by the ball-in-tube inclinometer.

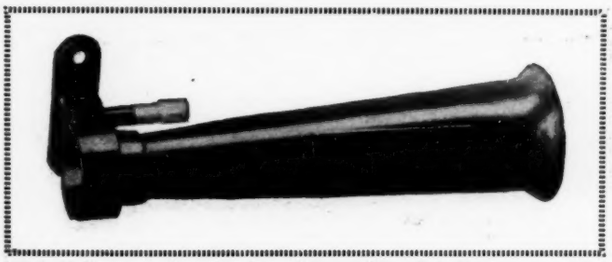
Except on very slow aircraft, the new small venturi tube, also shown, is used to drive the Flight Indicator. It weighs less than 6 oz., and has very low head resistance.

While the Pioneer Company's principal customers at present are the Government Air Services, they have great faith in civil aviation, and have made up a stock of Flight Indicators for commercial use. These instruments are manufactured and sold in the United States under exclusive Sperry license.

The Flight Indicator is used for controlling the flight of aircraft under conditions of poor visibility, or when for any reason it is desirable to eliminate yawing or turning, and to maintain a laterally level attitude. Its use also enables the pilot to bank at the proper angle when turning.



The new Pioneer Flight Indicator which only weighs 18 ounces



Small Venturi tube which actuates the Flight Indicator

A compass, by itself, is of little value when flying in clouds or at night, as it is practically impossible for a pilot to hold his ship on a straight course, and a compass will only indicate correctly during straight flight or on very slow turns. By using a Flight Indicator, which shows the slightest divergence from straight flight, the pilot avoids turning, and his compass will function properly. A straight course is maintained by steering so as to keep the hand in the central position. By keeping the ball in the center of its tube the aircraft is held laterally level when flying straight, or on the correct bank when turning.

The sensitive element of the turn indicating mechanism is a small air-driven gyroscope, operated by the vacuum secured from a venturi tube. The gyro is mounted in such a way that it reacts only to motion about a vertical axis, being unaffected by rolling or pitching.

Constructional details of the Pioneer Flight Indicator have been worked out very carefully. The whole instrument is non-magnetic, permitting it to be used close to the compass. Adjustment of sensitiveness is readily made to suit any flying conditions. The gyro runs on specially designed precision ball bearings, to which oil is supplied from a reservoir within the gyro.

Aeronautical Engines at the Paris Exposition

Exhibits Range from 1000 hp. Lorraine-Dietrich To 10 hp. Gnome Radial for Auxiliary Sailplanes

The following notes on the aero engine exhibits at the Paris Salon are reproduced from our excellent English contemporary *The Aeroplane*. The accompanying table of characteristics is from *L'Aérophile*.

Anzani

The Anzani exhibit covered the whole range of their well-known radial engines—which differ very little from their products of before the war—except that in all cases the inlet valves are now mechanically operated. The types in production are 30 hp., 3 cylinder; the 50 hp., 6 cylinders; and the 100 hp., 10 cylinders. These engines are extensively used for sporting and training machines and appear to give excellent service.

Farman

The Farman engines, which have appeared at the Salon now for three successive years, have it is said passed the French government type test, and the Farman firm has it is understood received important orders for the 600 hp. model.

At previous shows three Farman engines were billed to appear—a 200 hp. 8-cylinder V, a 400 hp. 12-cylinder V and a 550 hp. 18-cylinder W type. The 200 hp. model seems to have been discontinued. The 400 hp. 12-cylinder V has been supplanted by an engine of similar power and equal number of cylinders, but is now of the W type. The general design however is not greatly altered.

The two engines are of similar design, and employ similar cylinder and connecting rod units, valve gear, etc., and differ only in that one has a four-throw crankshaft and four rows of cylinders, and the other a six-throw crankshaft and six rows of cylinders. The cylinders are of equal bore but the 600 hp. model has an increased stroke.

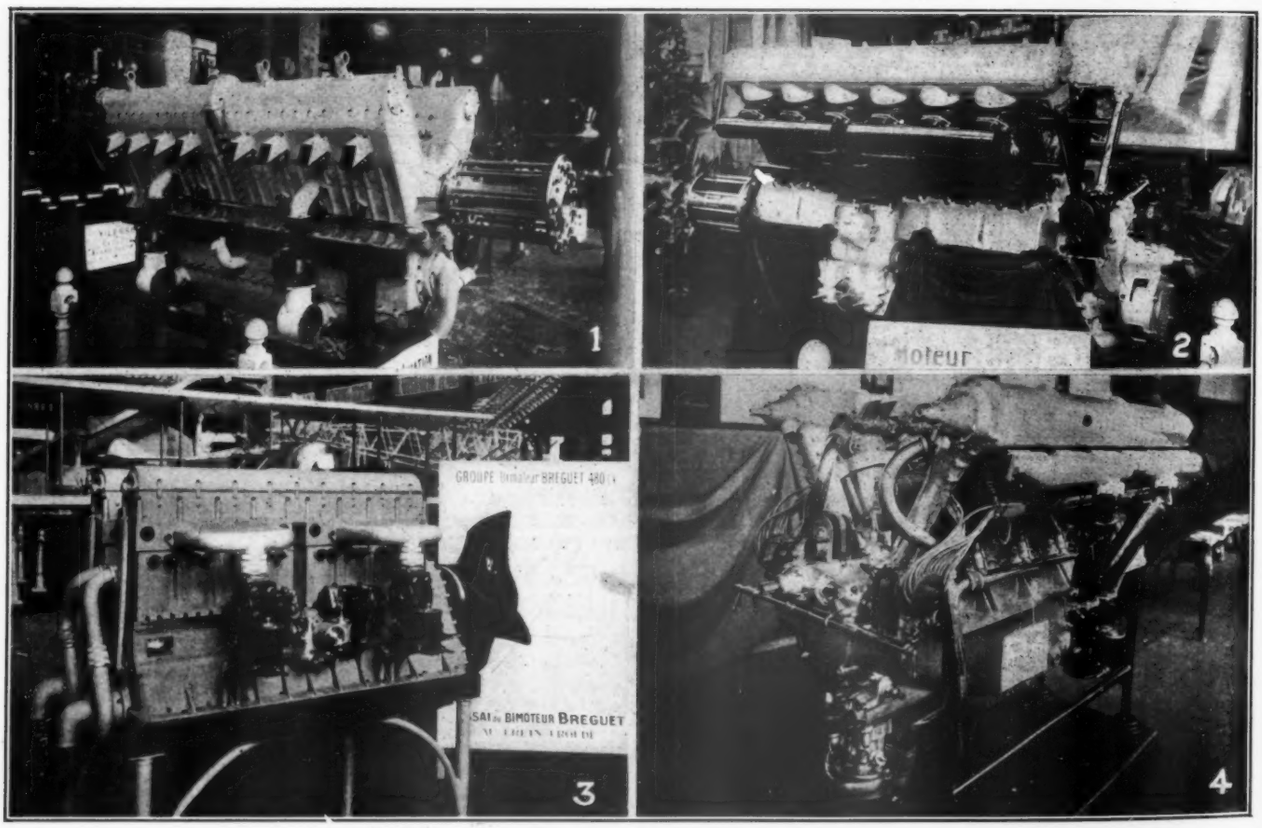
The cylinders are machined from steel forgings, have welded-on cylinder heads and are made up in two-cylinder blocks each with a common welded sheet steel water jacket. There are four overhead valves per cylinder—two of each kind—operated by rocker arms and push rods from camshafts carried in the top of the crank-case. Aluminum pistons and tubular connecting rods are used.

The big end assembly is of the usual articulated type—the muster rod carrying the white metal journal and being provided with deep flanges on the big end casing between which the two side rods are pivoted.

The engines are fitted with two magnetos and a generator and two coils and distributors, and are equipped with the Farman concentric bevel reduction gear for the airscrew. A series of such gears are standardized and interchangeable one with another, giving a choice of gear ratios of 1 : 2, 1 : 1.84, 1 : 1.67 or 1 : 1.5. Direct drive can also be provided.

Gnome and Rhone

The *Société des Moteurs Gnôme et Rhône* exhibited the well-known Le Rhône engine in the standard 80, 110, and 180 hp. models—which show no change of any kind. In addition they exhibited the "Jupiter" 400 hp. air-cooled radial de-



New aero engines at the Paris Salon—(1) 16 cyl. 600 hp. Peugeot; (2) 12 cyl. 500 hp. Panhard-Levassor; (3) 16 cyl. 500 hp. Bréguet-Bugatti twin power plant; (4) 12 cyl. 550 hp. Renault

TABLE OF CHARACTERISTICS OF ENGINES AT THE PARIS SALON

Make	Rated hp.	Normal r.p.m.	No. and Disposition of Cylinders	Bore (mm.)	Stroke (mm.)	Compression ratio (kg.)	Weight (kg.) Dry	Weight (kg.) per hp.	Consumption per hp. hr. (g.) Fuel	Consumption per hp. hr. (g.) Oil	Cooling
Anzani	200	1450	10 star	125	175	4	249	1.24	300	75	Air
"	200	1450	"	115	150		180	0.90			"
"	110	1450	"	105	145		175	1.50			"
"	90	1450	"	105	125		141	1.45			"
"	70	1450	6 "	105	125		92	1.20			"
"	50	1450	"	90	125		78	1.56			"
"	30	1450	3 "	105	105		60	2.			"
"	20	1450	"	90	120		50	2.50			"
Breguet Multimotor (1)	480	2150	16 twin-vert.	108	160	5.5	500	1.04	225	30	Water
"	950	2150	32 "	108	160	5.5	1.086	1.14	255	30	"
Bristol	100	1600	3 star	146	159		147		255	14	Air
"	380	1575	9 "	146	190		330	0.88	250	22	"
Farman (2)	600	1860	18 W	130	180	5.5	840	1.020	220	10	Water
"	400	1880	12 W	130	160	5.5	500	0.930	220	10	"
Fiat	685	1650	12 V	170	210	4.5	730	0.970	230	22	"
Gnome-Rhone	120	1250	9 rotary	112	170	5	147	1.22	275	54	Air
"	80	1200	"	105	140	5	122	1.50	275	50	"
Hispano-Suiza	300	1800	8 V	140	150	5.3	275	0.916	230	12	Water
"	180	1800	"	120	130	5.3	192	1.066	230	12	"
Lorraine-Dietrich (3)	400	1700	12 V	120	170		383	0.920	240	18	"
"	425	1800	12 W	120	180		365	0.810	240	20	"
"	475	1600		126	200		435	0.915	238	20	"
"	1.000	1600	24 W	126	200		850	0.860	235	17	"
" geared	400	1800	12 V	120	170		440	1.073	244	20	"
Panhard-Levassor (4)	500	1550	12 V	165	170	6	590	1.180	225	25	"
Peugeot (5)	500	1000	16 V	130	180						"
"	550	1650	12 V	160	175	5.2	630		265		"
Renault	300	1500	12 V	125	150	5	380	1.10	240	20	"
"	450	1550	"	134	134	5	430	0.91	240	20	"
"	550	1500	"	160	180	5.3	660	1.06	240	20	"
Salmson Az9	300	1500	9 star	140	170	5	330		235	20	"
" Cm9	260	1600	"	125	170	5.4	250		235	25	"
" Cm18	500	1600	18 "	125	170	5.4	425		236	85	"
" AB9	200	1500	9 "	125	170	5	240		250	25	Air
" AE9	100	1550	"	100	130	5	140	1.4	250	30	"
Talbot-Darracq (5)	100	1200	6 V	120	130		180	1.8	215	4	Water
"	300	2000	12 V	110	135		380	1.26	215	8	"
"	400	2000	"	122	160		460	1.12	220	8	"

(1) Two vertical rows of cylinders; equipped with speed regulator.
(2) Double ignition system by magnetos and Delco batteries.
(3) Cylinders at 60 deg. angle on the 400,425 and geared 400 models.
(4) Fitted with supercharger.
(5) Geared models.

veloped by the Bristol Aeroplane Co. for which this firm has now acquired the French rights.

The only other novelty on the stand was a two-cylinder air-cooled flat twin of the type used on motorcycles, fitted with a reduction gear and a propeller hub, and described as a 10 hp. engine for "aviettes."

Hispano-Suiza

The *Société Hispano-Suiza* showed the same exhibit as that of last year—one standard 300 hp. model, Guynemer's historic 200 hp. model known as "Vieux Charles," and one of their 6-cylinder car engines complete with gear-box and clutch.

Lorraine Dietrich

The *Société Lorraine des Anciens Etablissements Diétrich et Cie* exhibited their 400 hp. overhead camshaft model, with several examples of the newer type of engine fitted with push rod operated valves. These were first exhibited in 1920, but do not yet appear to have been used in the air.

These later engines are of varying powers, built up from varying combinations of similar cylinder blocks. There is a 24-cylinder W type of 1,000 hp., an 18- cylinder W type of 500 hp. both of which were shown .

Peugeot

The Peugeot firm exhibited one of the very few new engines of the Salon. This was a 500 hp. 16-cylinder engine bearing a very strong resemblance to the Bugatti engine. The Bugatti, it may be remembered, was really four vertical 4-cylinder engines, arranged two side by side, and two end to end. Each block of four cylinders owned its own crankshaft though showing a common crank-case. The two sets of crankshafts which were in line were coupled together, and the two lines of crankshafts were geared to a common propeller shaft—the two lines rotating in opposite directions.

In the new Peugeot the two lines of cylinders are inclined together at a slight angle, and there are only two four-throw crankshafts. Between their ends—that is in the middle of the engine—there is mounted a pinion, which gears with a spur wheel on the propeller shaft. This shaft passes through the crank-case of the forward 8-cylinder unit directly above the crankshaft.

As in the case of the Bugatti all valve gear and other auxiliary drives are taken from the center of the engine instead of from one end. The obvious intention of the designer is to avoid the crankshaft whip, and the risk of torsional vibration to which 8-throw shafts are liable owing to their necessarily great length.

Renault

The *Etablissements Renault* showed no new engines but confined their exhibit to their well-known standard 550, 450, and 300 hp. types.

Talbot Coatalen

Two of the well-known Coatalen engines, the "Manitou" of 300 hp. and the "Matabele of 420 hp. were exhibited under the above style. These engines differ in no way from the engines of similar names made in England by the Sunbeam Motor Car Co.

Salmson

The *Société Anonyme des Moteurs Salmson* showed a complete range of their well-known radial engines.

This is a small 9-cylinder air-cooled radial, intended for school work, developing 100 to 120 hp. and is known as the type AE9. In all essential features it is very like the AB9 of 200 hp. exhibited at the previous Salon—and also at this.

The essential dimensions of this new model are given in the accompanying table.

For the rest the firm exhibited the AB9 air-cooled, a cylinder of 200 hp., the well-known Z9 of 260 hp., the AZ9 of 300 hp. and the CM18—a two-row edition of the Z9 developing 500 hp.

Survey of the Aircraft Industry

U. S. Tariff Commission Issues Questionnaire

The United States Tariff Commission, in order to secure information required by Congress, is preparing a survey of the industries producing airplanes and seaplanes in the United States. The scope of the proposed survey is indicated by the accompanying questionnaire. Although this is drafted more particularly for the replies of manufacturers, the inquiries will indicate to importers and others the nature of the information required.

The Aeronautical Chamber of Commerce, 501 Fifth Ave., New York, requests that interested parties fill out the questionnaire and forward it to its office, with comments, if desired. Information marked confidential will be so regarded both by the Chamber of Commerce and by the Tariff Commission.

Questionnaire for U. S. Tariff Commission

The tariff paragraph of the Act of 1922 reads as follows: Par. 370. Airplanes, hydroplanes,* and parts of the foregoing, 30 per centum ad valorem.

Name and address of concern reporting.

State whether the above mentioned articles are major or minor products in your establishment.

(Catalogs are desired by the Commission)

Description—State briefly any essential differences in construction which characterize broad and distinct types of airplanes and hydroplanes; for example, the differences between military and commercial types; state for what uses different types are adapted.

Domestic Production—State briefly, so far as known to you, the production in the United States, of the branch of the industry in which you are engaged, for the years 1913 and 1921. Give separately production for military and commercial aviation.

Materials—State what materials are requisite, chief sources of supply and whether the supply is adequate. Is the American manufacturer at any advantage or disadvantage in procuring a supply sufficient for his needs? (If in your opinion the availability of materials is affected by the tariff, state how and to what extent such availability is so affected.)

Equipment—State what, if any machinery or other important equipment is imported, and the relative advantage or disadvantage of the American manufacturer in procuring equipment.

Methods of Production—Describe—briefly, and only in so far as is necessary to indicate the degree of standardization—methods of production; use of power or automatic machinery; and differences between American and foreign processes. State what percentage of the total persons employed in your factory are (a) male; (b) female; (c) skilled workers.

Organization—State whether the efficient conduct of the industry permits or requires small or large factories and capital and give the amount, or approximate amount, of capital invested in the domestic industry, and whether it is scattered among many firms or few.

Domestic Consumption—Give the amount or the approximate amount, of the total annual domestic consumption of your class of manufactured articles, and state whether domestic production is sufficient to supply the entire domestic consumption. If it is not, describe concisely why domestic production is limited.

Domestic Exports—State the amount of your exports in 1913 and 1921, the places of destination, the nature of the exports, whether your products compete with or are supplementary to foreign products also exported to those markets, and whether the American producer has some advantage or is under some disadvantage in the particular market or markets. Name the countries whose products compete with yours.

Foreign Production—Name the principal foreign producing nations; state the relative importance and the nature and quality of their products; their advantages and disadvantages; their use of machinery (paying special regard to kinds and extent of use as compared with machinery used in the United States).

Imports—Name the principal nations exporting to the United States; discuss the nature of the imports, and the extent to which importation is due to greater cheapness, superior quality, or special characteristics of the foreign articles.

Prices—Give your prices on typical planes for several years to show fluctuations. If possible, give foreign wholesale prices on comparable products, stating dates and markets where such prices prevailed.

Patents—Is your product covered by important basic patents owned by you or do you manufacture under license from other persons or concerns owning or controlling such basic patents? Approximately when do such patents expire? To what extent is importation controlled by American patents? To what extent is manufacturing carried on in this country under foreign patents?

Tariff Considerations—Is the wording of tariff paragraph 370 (as given above) open to any misinterpretation, or is the designation sufficiently clear and definite?

General References—are desired to possible sources of information on production and manufacture of these commodities in any form, particularly as regards foreign production and prices.

Give a list—under separate heads, of names and addresses of manufacturers and importers of the articles mentioned in the tariff paragraph.

* In the words of the law *hydroplane* apparently designates a seaplane.—EDITOR.

Liquor Smuggling by Aircraft

Liquor running by airplanes from Montreal to Long Island points has become so profitable that many aviators have entered the bootlegging game, according to Federal prohibition agents investigating liquor law violations in New York and New Jersey coastal counties.

Rutland, Vt., is one of the stopping places of the air fleet engaged in bringing in the liquor. A field has been fixed up there so that the fliers can get fuel and other supplies.

"My route was from Long Island obliquely across Manhattan Island," one aviator is alleged to have told federal agents, "and then paralleling the Hudson to Albany, where I veered easterly to Rutland. From Rutland I kept her nose to the compass due north for about a hundred miles, then north by northwest to the northern edge of Lake Champlain. A few minutes later brought me to the airdrome, outside of Montreal. While this was a semi-government field I was able to arrange for landings there.

"Through airdrome gossip, which I heard at Montreal while waiting for my plane to be loaded I learned of various schemes employed by pilots to preclude the possibility of getting evidence against them in the event of capture.

"I heard of one chap who had installed a trap door to the floor of his liquor compartment. In the event of threatened capture he could pull a string and dump his cargo. Another flier always camouflages his machine by changing various markings before each trip and he always leaves Canada by a different route from which he entered.

"The game of transporting wet goods from Canada to Long Island is safe enough. There seems only a remote possibility of arrest. No registration of machines is necessary, and here it is that the air smuggler has a decided advantage over his associates who travel overland."

Congress will be asked by the Prohibition Enforcement Department, federal agents aver, to pass laws restricting air flights and promulgating regulations that will lessen the possibility of flying craft having such liberties as they now enjoy.

Secret British Aircraft Development

Thirteen Manufacturers Engaged in War Work

Our London contemporary *Flight* devotes its entire issue of Dec. 14, last, to a review of the British aircraft industry, dealing in separate section with the manufacturers of aircraft, aero engines and equipment and accessories. The subject is treated in the form of brief sketches of past and present activities of British aircraft constructors. No technical descriptions of aircraft or engines are given, and mention of new types or of experimental work is always accompanied by the remark that owing to the novel nature of this machine the Air Ministry witholds all particulars. An actual count of the instances in which this remark occurs shows that there are thirteen British aircraft manufacturing firms which are carrying on confidential development work for the Air Ministry. The following notes will give the reader a brief glimpse of the nature of this "hush-hush" work.

Armstrong-Siddeley Motors, Ltd. of Coventry, recently completed the "Sinaia," a military twin-engined tractor biplane fitted with two Siddeley "Tiger" engines, of unknown horsepower. The firm is now engaged on experimental metal construction work. Boulton & Paul, Ltd., of Norwich, have produced an all metal twin-engined airplane, the "Bolton," which was briefly described in a recent issue of AVIATION, but concerning which no data are available. Boulton & Paul are in particular experimenting with steel aircraft construction. The Bristol Aeroplane Co. of Bristol are experimenting with a new machine of "very unorthodox and highly interesting" design.

The Blackburn Aeroplane & Motor Co. of Leeds are the builders of the new fleet spotter, the "Dart." A new bomber, the "Derby," has been produced by the De Haviland Aircraft Co. of Edgware, while several new types of seaplanes and amphibians, among them the "Pintail," the "Fawn" and the "Flycatcher" have been produced by the Fairey Aviation Co. of Hayes. Handley-Page, Ltd. of Cricklewood are the builders of the "Hanley" torpedo plane, which is fitted with the Handley-Page slotted wing. Two new designs, one for a two-seater observation, and the other for a single-seater pursuit machine, have been prepared by the Hawker Engineering Co. (of which T.O.M. Sopwith is director) for the Air Ministry, which has accepted them. George H. Parnall & Co. of Bristol, well known for their "Panther" ship's plane, have brought out an improved type, the "Puffin," and are completing two new types. One of these is the "Possum," triplane. A. V. Roe, Ltd. of Manchester and Hamble are working on the 1000 hp. "Aldershot," on the "Aldershot Bomber" equipped with the Rolls-Royce 680 hp. "Condor" engine, and on the "Bison" fleet spotter, fitted with a Napier "Lion" engine.

The Supermarine Aviation Works of Southampton have received an order from the Air Ministry for the largest flying boat to be built since the war, and also for the largest twin-engined amphibian flying boat. The construction of these machines is nearing completion. The "Vernon" troop-carrier, built by Vickers, Ltd. of Weybridge, and the "Walrus" fleet-spotter, built by the Westland Aircraft Works of Yeovil, are other new military aircraft.

Among new British engine developments may be mentioned a semi-Diesel engine in course of development by Beardmore, Ltd.; the 1000 hp. Napier "Cub" X type engine which is fitted to the new Avro "Aldershot," flying trials of which are soon to take place; and the Sunbeam "Sikh" engine, also of 1000 hp., which is a 12 cylinder V type.

It does not seem from this all too brief enumeration as if the British aircraft industry were inactive. The secrecy with which the British Air Ministry surrounds the construction and development work now going on is significant.

D. B. Helicopter Lifts Two Persons

The de Bothezat helicopter, which was briefly described in our last issue, is undergoing continued trials at McCook Field. On Jan. 19 the machine lifted two persons, Maj. Thurman S. Bane, formerly commandant at the field, and Art Smith, the veteran civilian flier, to a height of about four feet. In this test the helicopter carried a total weight of 3750 lb., or 450 lb. in excess of its designed gross weight. After this test several other flights were made by Major Bane and Pilot Smith individually. The maximum height reached was 10 ft.

The following additional particulars on the D. B. helicopter are now available. The power plant consists of a 170 hp. Le Rhône engine, which never has been used full-throttled in any test. A total blade area of 900 sq. ft. is used to lift the machine. There are four propellers on the machine, each having six blades. The diameter of the propellers is 25 ft.

The machine is capable of rising vertically in the air and hovering over one spot. Descent is made vertically also. It can travel horizontally as well as vertically and will glide to earth without danger in case engine trouble is encountered, for the projected area of the propellers, when turning free, slow down the descent to a safe speed.

The estimated cost of the machine, according to the *New York Times*, from which these particulars are taken, is $200,000.

Trials of New Oehmichen Helicopter

A new helicopter, built by the French inventor E. Oehmichen, recently made a flight of 2 min. 37 sec. and flew horizontally a distance of about 250 ft.

The machine is propelled by a 120 hp. Le Rhône engine, and has four lifting screws and one tractor propeller, the latter for horizontal flight. A gyroscope endows the machine with automatic stability.

A previous Oehmichen helicopter which was fitted with two lifting screws, showed instability on trials. For this reason it was tested attached to a small cylindrical balloon which in part contributed to its lift.

Germany and the I.A.C.

The Council of Ambassadors has received a note from the German government in which the latter declares its readiness to adhere in principle to the International Air Convention of 1919. Germany desires, however, to receive information regarding certain technical provisions of the Convention before it will give its final assent to becoming a signatory state.

This provisional arrangement will enable civil aircraft of ex-Allied countries to fly over German territory, and German civil aircraft to enjoy reciprocal treatment, until a final agreement is arrived at.

Brazil to Purchase Airplanes

The Brazilian Ministry of War has been authorized to purchase airplanes and parts to the amount of 2,000,000 milreis by a decree signed Nov. 14, 1922, by the President. A contract has been made with the Companhia Constructors de Santos for the construction of a school of naval aviation in Santos at a cost of 4,350,000 milreis, according to a report from Assistant Trade Commissioner M. A. Cremer, Rio de Janeiro.

Relative Strengths of European Air Forces

Ratio of France-Great Britain-Belgium 11 : 4 : 1½

The British Air Ministry recently placed at the disposal of the press copies of answers to questions addressed in the House of Commons to Sir Samuel Hoare, Secretary of State for Air, regarding the relative strength and organization of the Air Force stationed in Europe of Great Britain, the French Republic, and the Kingdom of Belgium.

It is stated in these answers that the strength of the Royal Air Force at present stationed in Europe, including units temporarily in the Constantinople Area, is approximately 15 squadrons, that of the French Air Service 100 squadrons and that of Belgian 14. The average establishment of the British squadrons is, however, 12 machines, while that of the French squadrons is 9 and that of the Belgian 10.

The relative numbers of fighting, spotting and bombing machines respectively of modern construction and fitted for service maintained in Europe by these three Powers is as follows: The total number of British Active Service Air Squadrons is 32, of French active squadrons 120, of Belgian active squadrons 14, the average number of airplanes being as given above. The British Air Minister does not think it advisable in the public interest to give the total number of British airplanes of each type which are of modern construction and fit for service, and, so far as is known, the Governments of France and Belgium have not made public similar information in regard to the French and Belgian Air Services.

Regarding the numbers of trained pilots, observers and mechanics respectively maintained by these three Powers in Europe on the active list, it is officially stated that there are in the Royal Air Force in Europe at the present time 1,158 trained pilots, 75 observers and 19,421 other ranks employed on ground duties. These figures include personnel employed at Flying Training Schools, Depots and other miscellaneous establishments. In the current French *projet de loi* provision is made for the maintenance in Europe in 1922 of 3,039 flying personnel and 30,477 other ranks, employed on ground duties. The second of these two figures is, however, misleading, since a large number of the personnel employed on ground duties in connection with the French Army Air Service (for example, personnel for wireless, recruiting, transport, works, provision of rations and clothing, medical services, etc.) are found from the Army and are not included in the foregoing. This personnel is not budgeted for separately or otherwise distinguished from Army personnel generally, and it is therefore impossible to assess their numbers with accuracy. This consideration also applies in the case of the French Naval Air Service. Figures are not available to classify the flying personnel as pilots or observers. The Belgian Army, including the Air Service, is at present in process of reorganization, and, pending completion of this reorganization, accurate figures for air service personnel will not be available. Prior to reorganization the approximate total establishment was 2,000 all ranks, but this figure is subject to the qualifications made in the preceding paragraph in regard to the personnel of the French Army Air Service.

Exact figures on the total number of military and civil airplanes built and building in France, in French possessions and in European territory occupied by France are not available. It is therefore impossible to give a figure for the number of military and civil airplanes built; the number on the Civil Register, however, on Dec. 1 was 660. As regards the number building, according to the latest information available French aircraft manufacturing firms have produced 3,300 machines for civil or military purposes during the first eleven months of the current year, making a monthly output of 300 machines. This figure includes aircraft built for export to foreign countries.

The total number of squadrons at present maintained by France is 128, and the normal establishment of machines held by a French squadron is 8 or 10, according to type.

The French Government has not, so far as is known, made public any particulars as to the number and weight of explosive and chemically charged bombs carried by their latest types of aircraft.

The Italian Air Reorganization

A decision to reorganize the Italian Air Force on a scale proportionate to the requirements of the country was reached at a recent meeting of the Ministers of War and Marine, together with the principal generals and admirals. Premier Mussolini presided.

A large number of airplanes will be built by Italian firms. Colonel Piccio, formerly air attaché in Paris, was appointed air commander and will be responsible to the Premier and the Ministers of War and Marine. It was decided that the Colonel and his subordinates shall use airplanes on their official travels.

Premier Mussolini appointed Commander Count Casagrande, famous Italian war aviator, as chief of aviation in his Cabinet.

Movies of Aviation Appreciated

Enthusiasm for Aviation movies, and explanations was evidenced in the wilderness 'back o' the yards' in Chicago by 400 boys and girls and adults recently in the Assembly recreation Hall of Davis Square, one of the South Parks System recreation centers. The program was fostered by the Aero Club of Illinois. Davis Square is a ten-acre tract with a field house containing club rooms, two gymnasiums, stage and dance hall, a kitchen and public library. Elmer Partridge, veteran flying instructor and aircraft builder, answered queries of the crowd, and told of some of his flights across country. Prior to his remarks, Phil Breckenridge told of learning to fly last summer under the tutelage of Partridge. The rough and raggedly dressed kiddies listened intently to that story: and watched three reels of movies, kindly loaned for the occasion by the Air Service Commanding Officer of McCook Field, with great interest. The movies showed formation flights, spraying an orchard from an airplane, and some views of the Pulitzer races with the world's speediest airplanes and their pilots.

This was a memorial occasin in the lives of those people—near Forty-fifth street and Marshfield avenue, Chicago—because their chances in life have been so limited. They expressed their thanks in vociferous applause after each speaker, and during the movies. The word and work of aviation could be more extensively advertised through public parks, the Aero Club of Illinois thinks, to good advantage.

A Junkers-Dornier Project

According to the aeronautical correspondent of the London *Daily Chronicle*, Prof. Hugo Junkers and Claude Dornier have decided to collaborate in the construction of a giant flying boat which is intended for transatlantic service.

This seaplane, which is to be the largest heavier-than-air craft ever built, will comprise three boat hulls and will weigh fully loaded 1000 tons. The power plant will consist of four groups of Junkers semi-Diesel engines. A maximum speed of 100 m.p.h. is expected.

In order to circumvent the provisions of the treaty of Versailles which prohibit the construction of such large aircraft, the Junkers-Dornier flying boat is to be built in Russia.

ARMY AND NAVY AIR NEWS

Air Service

General Mitchell on Long Air Trip—Brig. Gen. Wm. Mitchell Assistant Chief of the Army Air Service, is planning an extensive flying trip in this country and Canada. Part of the journey will be made with his aide, Lt. C. Bissell, A.S., by airplane.

Leaving Bolling Field, D. C., General Mitchell is expected to fly to McCook Field, Dayton, Ohio, where he is to inspect the Air Service Engineering Division, and probably a number of new types of airplanes there, as well as the de Bothezat helicopter. From McCook Field he plans to fly to Selfridge Field, to inspect the First Pursuit Group of the Army. His plane will be left there in order to have winter equipment, believed to include skee-landing devices and other apparatus to enable him to fly in cold weather which he may encounter on his northern trip into Canada.

Proceeding by rail, General Mitchell with Lt. Bissell, will visit air plants and stations in the neighborhood of St. Louis and then travel to San Antonio, Tex. El Paso will also be a stop on the southern leg of the trip, part of which will probably be covered by airplane. The Observation Group on the Mexican Border will also be inspected before a return to San Antonio is made.

Returning to Selfridge Field, General Mitchell will take off in his re-fitted plane for the Canadian Air Station at Camp Borden, from which point he will fly to Toronto. Ottawa and other centers in Canada as the guest of the Canadian Air Board, it is understood. Later he will return to Washington, but his route is not known.

* * *

Army Orders—First Lieut. Harold A. Packard, A.S., now on leave of absence, to Bolling Field.

Capt. Raymond E. O'Neill, A.S., from Scott Field to C.A.S. for duty.

First. Lieut. Robert G. Breene, Sec. Lieut. Harlan T. McCormick, and Sec. Lieut. Robert W. C. Wimsatt, A. S., from Kelly Field, to Brooks Field.

First Lieut. Howard C. Brandt, A.S., from present duty at Chanute Field to Communications School for course of instruction.

Sec. Lieut. Edward H. Holterman, A.S.O.R.C., ordered to active duty with his consent, to McCook Field for three month course in engine and plane maintenance.

Retired for incapacity for active service: Capt. Cassius H. Styles, A. S.; Capt. Roland L. Davis, A.S.; Capt. Chester P. Dorland, A.S.; First Lieut. Richard E. Thompson, A.S.

Resignation of First Lieut. William Edmund Connolly, A.S., is accepted by the President.

Capt. Albert D. Smith, A.S., Mather Field, home to await retirement.

First Lieut. Wesley A. Zellner, A.S., from Kelly Field to Primary Training School, Brooks Field, for course in instruction.

Maj. Theodore Charles Macaulau, A.S.O.R.C., ordered with his consent to active duty with 91st Observation Squadron, Crissy Field.

First Lieut. Richard K. LeBrou, A.S., from Kelly Field to Air Intermediate Depot, Middletown, Pa.

* * *

Two Fine Performances—Two very fine high-speed flights were recently made by Air Service officers from town to town.

On Jan. 20, Lieut. Alexander Pierson, A.S. pilot, and Bradley Jones, civilian employee at the Air Service Engineering Division, flew in a DH4B from McCook Field, Dayton, Ohio, to Mitchel Field, N. Y., covering the 592 miles in 4 hr. 4 min. Pearson and Jones took off from McCook Field in a 100 m.p.h. westerly wind at 12.28 (Eastern time) and landed at Mitchel Field at 4.32 p. m. The plane was buffeted somewhat by bumpy side winds over Harrisburg, Pa., but otherwise the trip was without incident. The route selected took the travelers over Springfield Columbus, Zanesville and Moundsville, Ohio; Pottsville, Harrisburg, Reading and Philadelphia, Pa.; Trenton, N. J., and this city.

Pearson said he maintained an average altitude of 3000 ft. during the four hours he was in the air. The fastest train covers the distance between Dayton and New York in sixteen hours. Pearson had hoped to make the trip at the rate of 200 m.p.h. in three hours, but he said that side wind interference prevented. He will attempt to make the return trip at that speed.

Jones said the trip had been made for the purpose of trying out a new air sextant developed for aerial navigation.

On Jan. 21, Capt. H. C. Drayton, flew a DH4B from Philadelphia to Mitchel Field, L. I., an air distance of 112 miles, in 42 min. The trip was made under adverse conditions, the engine stopping six times during the flight.

"Fortunately, a good northeast wind was blowing at the altitude of 4,200 ft., which I maintained," Captain Drayton said. "As a result I did not lose speed when the engine stopped. I was able to start the engine each instance without difficulty."

* * *

Aeronautical Ratings—The War Department advises that one or more of the aeronautical ratings specified below may be granted to officers of the Regular Army, National Guard, and Organized Reserves commissioned in or detailed to the Air Service upon attaining the prerequisities prescribed for the respective ratings as follows:

1. *Airplane pilot*—Graduation from the observation, bombardment, pursuit, or attack course at The Air Service Advanced Flying School.
2. *Airship Pilot*—Graduation from the regular course at The Air Service Balloon and Airship School.
3. *Junior airplane pilot*—Graduation from The Air Service Primary Flying School or successful completion of such flying

Coming Aeronautical Events

AMERICAN

May — *National Balloon Race.*

FOREIGN

1923

March 15 — *Entries close for Dutch Height Indicator Competition.*

June — *International Aero Congress, London.*

July 20-*Aug.* 12 — *International Aero Exhibition, Gothenburg, Sweden.*

Dec. 1 — *Entries close for French Engine competition.*

and technical examinations as may be prescribed by the Chief of Air Service.

4. *Junior airship pilot*—Graduation from the National Guard and reserve officers' course at The Air Service Balloon and Airship School.

5. *Airplane observer*—Graduation from the observation course at The Air Service Advanced Flying School.

6. *Balloon observer*—Graduation from The Air Service Balloon and Airship School.

Naval Aviation

Naval Air Maneuvers off Panama—In conjuction with the joint maneuvers of the major portions of all the United States naval fighting forces off Panama in the Pacific this winter, the aerial forces of the Navy on the Atlantic coast will stage the greatest air operation ever attempted, here or abroad, according to plans just being finally completed by the department.

On Jan. 7, thirty-six planes, bombers, scouts and torpedo planes started south in two sections on a record-breaking cruise. Half of them, the torpedo and bombing planes, have as their destination, Key West. The other eighteen, the F5L scouting squadron, started on Jan. 12, from the same base at Hampton Roads, with the Pacific rendevous as their destination, a round-trip flight of approximately 6000 miles, the greatest single flight for a large number of planes ever attempted. The planes going to Key West will have as their convoy, the U.S.S. Shawmut, as mother ship, and the Lark, Mahan and Maury of the Mine Squadron, as supply ships. The U.S.S. Langley, the Navy's new and only aircraft carrier, left Hampton Roads Jan. 9 for Pensacola where she will be during the winter months.

The entire movement of the Atlantic forces will be under the command of Capt. W. R. Gheradi, Commander, Aircraft Squadrons, Scouting Fleet. He will have as his aide and acting chief of staff, Lieut. Comdr. Wadleigh Capehart. The Scouting Force will be under command of Lieut. Comdr. J. C. Montfort and the Torpedo Squadron will be under Lt. Comdr. H. T. Bartlett.

The scouting plane squadron will visit half dozen Central-American ports en route to the Canal, and the usual formalities that precede the visit of our warships to foreign ports are being gone through with by the State Department.

The eighteen scouting planes are scheduled to leave Key West on Jan. 28, the first stop being Muriel, Cuba. The tentative schedule from there calls for stops at Mugeres Island, off the coast of Yucatan; Belize, British Honduras; Truxile, British Honduras; Cape Gracias a Dios, Nicaragua; Great Corn Island; Bocas del Toro, Costa Rica, and Colon.

Under the plans still in the making, Secretary Denby or Admiral Ceontz, or both, will be host on the transport for members of the House and Senate Naval Affairs committee, many other members of Congress and news writers.

• • •

Aircraft Squadrons in the Reorganized Fleet—The General Order which puts into effect a new general plan for the organization of the Navy afloat provides that aircraft squadrons shall be included in the Battle Fleet, the Scouting Fleet, and the Fleet Base Force.

For the time being, owing to shortage of equipment, only the Scouting Squadron includes aircraft squadrons, as follows:

U.S.S. Wright, flagship and aircraft tender, Capt. W. R. Gherardi, Commander, Air Squadrons:

Eighteen F5L scouting planes;

Eighteen PT torpedo planes.

The Torpedo Plane Squadron, Scouting Fleet, left Hampton Roads Naval Air Station for Key West, Fla., on Jan. 8. The Airplane tender Wright left the Roads Jan. 11 for Guantanamo Bay, Cuba.

The Scouting Fleet, now in the Atlantic, and the Battle Fleet, now on the Pacific coast, are to effect their junction at Panama on Feb. 19. Fleet maneuvers will take place between that date and March 31.

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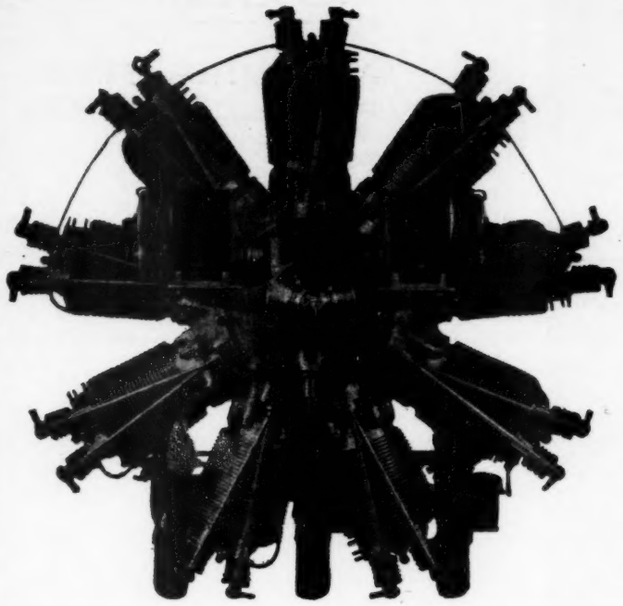

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INDEX TO ADVERTISERS

A

Aircraft Service Directory..... 142

C

Classified Adv..... 140
Curtiss Aeroplane & Motor Corp..... 118

D

Dayton Wright Co..... 143
Detroit Marine-Aero Eingine Co..... 139

J

Johnson Airplane & Supply Co.....141

L

Lawrance Aero Engine Corp..... 139

M

Martin, The Glenn L., Co..... 144

N

Northrop, Marvin A..... 140

O

O'Brien, Clarence A..... 141

T

Thomas-Morse Aircraft Corp..... 119

V

Vought, Chance, Corp..... 139

W

Warner, Edward P..... 140
Wellington, Sears & Co..... 140
Where to Fly..... 138
Wright Aeronautical Corp..... 120

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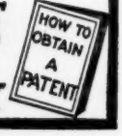

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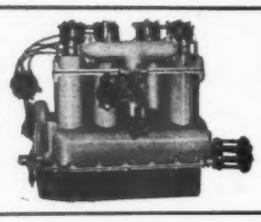

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